Analysis of the Scope, Functionality, and Usability of the Joint Readiness Training Center (JRTC) Data Base Archive

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Judith J. Nichols
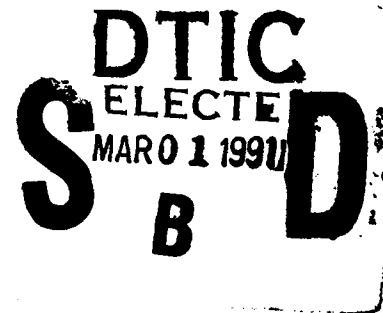
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for

**Contracting Officer's Representative
Michael R. McCluskey**

**Presidio of Monterey Field Unit
Howard H. McFann, Chief**

**Training Research Laboratory
Jack H. Hiller, Director**

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JON W. BLADES
COL, IN
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Technical review by

Rick Bogdan
Carol A. Johnson

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19. ABSTRACT *(Continue on reverse if necessary and identify by block number)*

This report presents an overview of the types of Joint Readiness Training Center (JRTC) unit performance data available to the Army training development community and some analysis techniques that demonstrate JRTC data scope, functionality, and usability. The demonstration analysis was performed across seven JRTC rotations for the defensive mission. Computerized O/C checklist data, personnel Battle Damage Assessment (BDA), and unit take home packages were the primary sources of information. The preparation of JRTC data for examination involved procedures that facilitated computerized data manipulation and generation of statistics across multiple rotations within the constraints of a Zenith Z-248 computer (the Army standard personal computer). The demonstrational analysis yielded only broad results regarding unit performance in conducting defense on the JRTC battlefield. However, the process of preparing and analyzing JRTC data extracted from the ARI-POM data base archive produced multiple illustrations of both positive and negative aspects of the scope, functionality, and usability of the data base archive. Four recommendations for data base enhancement were
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19. ABSTRACT (Continued)

made: (1) Develop a unit performance measurement system that facilitates
analysis of relationships between tasks; (2) Develop a T&EO schematic that
links related or matching subtasks and subtask standards across modified T&EO
tasks; (3) Augment data collection system to require annotations when T&EO
data conflict with task ratings; and (4) Standardize all JRTC automated file
formats. The JRTC data base archive includes a broad spectrum of unit perfor-
mance information that provides great potential for in-depth post-rotational
analysis of light force training and light force training issues. Whether this
potential is realized depends on future data collection and data management
developments.

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FOREWORD

The U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) has a major research program that supports the combat training centers (CTCs) sponsored by the Training and Doctrinal Command and the Deputy Chief of Staff for Personnel. One of the principal goals of this program is archiving and development of CTC data.

The research described in this report was conducted by the U.S. ARI Presidio of Monterey Field Unit, whose mission is to increase Army unit combat performance measurement and evaluation methods, unit training programs, management tools, and the CTC data base.

The program task that supports this effort, "Develop Analysis Framework and Tools for Synthesizing and Interpreting Information from CTCs," was sponsored by the Center for Army Lessons Learned (CALL).

ANALYSIS OF THE SCOPE, FUNCTIONALITY, AND USABILITY OF THE JOINT READINESS TRAINING CENTER (JRTC) DATA BASE ARCHIVE

EXECUTIVE SUMMARY

The purpose of this paper is to present (1) an overview of the types of Joint Readiness Training Center (JRTC) unit performance data available to the Army training community, and (2) some analysis techniques that can be used to examine light force performance at the JRTC. This was accomplished by performing a demonstration analysis of JRTC data across seven (7) rotations. "Conduct of Defense" was selected as the particular training focus because the characteristic set of data used to evaluate units during defensive operations was deemed to be the most stable over time (i.e., underwent the least extensive modification).

Computerized Observer/Controller (O/C) Training and Evaluation Outline (T&EO) checklist information, personnel battle damage assessments, and weapon system firing data were the primary sources of data selected to support the demonstration analyses. The preparation of JRTC data for examination involved procedures that facilitated computerized data manipulation and the generation of statistics across multiple rotations within the constraints of a Zenith Z-248 personal computer (PC) with 20MB hard disk (i.e., the Army standard personal computer).

The primary analysis was conducted using data across all echelons and slices in order to portray general task force (TF) performance in the defense. A second analysis also was conducted using only fire support data. Four measures were selected as meaningful indicators of difference in TF performance based on their capacity to delineate differences in performance and for their availability in the data base. The outcomes of the application of various frequency distribution procedures to each of the four indicators of performance generally illustrate the scope, usability, and functionality of JRTC data.

The second analysis demonstrates the impact of the dynamics of T&EO development during the first 3 years of JRTC training. The "fit" between tasks, subtasks, and subtask standards across T&EO checklist tasks during the period under investigation was less than complete because of the continuous effort to improve T&EOs and correlate them to Army Mission Training Plans (AMTPs) as they become available. In order to depict the effects of the evolution of T&EO checklists over time, company fire support data were isolated and analyzed.

While the data analyses yielded only very broad results regarding unit performance in the conduct of defense on the JRTC battlefield, the process of preparing and analyzing the data extracted from the U.S. Army Research Institute Presidio of Monterey Field Unit (JRTC) data base archive produced a number of illustrations of both the positive and negative aspects of the scope, usability, and functionality of JRTC data. Generally, the scope of JRTC data is remarkably broad. For the most part, data have been organized, automated, and documented such that they can be used to examine many JRTC and/or light force training issues. However, there are several inhibiting factors associated with the use of the data base which, while they do not preclude data analyses, may encumber analytic efforts. Four recommendations for data base enhancement were made as a result of this examination:

- Develop a unit performance measurement system that facilitates analysis of relationships between tasks;

- Develop a T&EO schematic that links related or matching T&EO subtasks and subtask standards across modified T&EO tasks;

- Augment data collection system to require annotations--particularly in those instances where T&EO data conflict; and

- Standardize all JRTC automated data file formats.

The JRTC data base includes a broad spectrum of unit performance information. The level of detail provided by T&EO subtask and subtask standard assessments when coupled with JRTC battlefield statistics (e.g., personnel and equipment battle damage assessments, weapon system firing information) offers analysts the potential to examine light force unit performance in great depth. However, whether or not that potential is realized will be determined by future JRTC data collection and management developments. The continuing modification of T&EO tasks and the persistent changes in data file organization and keyword identification codes make it increasingly more difficult to examine training issues over time (trendline analyses).

ANALYSIS OF THE SCOPE, FUNCTIONALITY, AND USABILITY OF THE JOINT
READINESS TRAINING CENTER (JRTC) DATA BASE ARCHIVE

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ANALYSIS OF THE SCOPE, FUNCTIONALITY, AND USABILITY OF THE JOINT READINESS TRAINING CENTER (JRTC) DATA BASE ARCHIVE

INTRODUCTION

U. S. Army light forces have been training at the Joint Readiness Training Center (JRTC) at Ft. Chaffee, Arkansas since the fall of 1987. The JRTC is one of four Army Combat Training Centers (CTCs) in various stages of operation in the United States and Europe. Other CTCs include the National Training Center (NTC), Ft. Irwin. CA, the Combat Maneuver Training Center (CMTC), Hohenfels, FRG, and the Battle Command Training Program (BCTP), Ft. Leavenworth, KS.

The primary objective of CTCs is to provide a facility where units undergo realistic training that cannot be accomplished at home station--largely due to the prohibitive cost of the CTC training environment. Although each CTC has a different training emphasis, they all share the Army's train-evaluate-train philosophy and provide

(1) highly realistic training scenarios;
(2) a dedicated opposing force (OPFOR);
(3) professional observer controllers; and
(4) systematic evaluation and feedback.

One of the secondary objectives of CTC training is to gather information that can be used to contribute to the improvement of doctrine, tactics, training systems, equipment, and procedures in the U. S. Army. In support of the CTC information gathering objective, the U.S. Army Research Institute at the Presidio of Monterey (ARI-POM) has developed and implemented a research program that includes as a technical objective the archival and administration of CTC data for training research and analysis. *The purpose of this paper is to present an overview of 1) the types of JRTC unit performance data which are currently available to the Army training community and 2) analysis techniques that can be used to examine light force performance at the JRTC.*

BACKGROUND

The primary training unit at JRTC is the infantry battalion task force (TF). TFs train during a fourteen-day rotational period that is divided into five mission phases that are approximately 72 hours in length. During each phase, units conduct a series of tasks that comprise the mission (e.g., Conduct a Defense, Deliberate Attack, etc.) for that phase. Missions vary slightly from rotation to rotation depending on the type of force training, however, the usual JRTC rotation consists of a deployment, a low-intensity offense, a defense, and two mid-intensity offensive missions.

The opposing force (OPFOR) replicates a Soviet surrogate reinforced airborne battalion during the deployment and low-intensity offensive missions, a motorized rifle battalion (+) during the defense, and a motorized rifle battalion or a Warsaw pact surrogate infantry battalion during the mid-intensity offensive missions.

JRTC training encompasses a variety of unit types and training scenarios. In contrast to the NTC where training essentially is focused on heavy unit types and missions, JRTC training is provided to a variety of light force unit types to include light infantry, air assault units, rangers, airborne units, special operations forces, as well as each unit's supporting elements. Additionally, units rotating through JRTC conduct both low-intensity and mid-intensity combat (LIC and MIC) scenarios that may vary according to unit type.

The individual character of training units (and training scenarios) at JRTC and the data collection mechanisms and types of data available present some interesting challenges to the JRTC training analyst. TFs receive a formal After Action Review (AAR) for each mission phase. TF performance is assessed by JRTC Observer Controllers (O/Cs) at all echelons from battalion to platoon. Limited brigade participation, TF slice element, and special team performance are assessed both as part of the overall TF performance and as individual elements. Selected Battlefield Operating Systems (BOS) and slice elements--e.g., fire support (FS), combat support (CS) and combat service support CSS), air defense artillery (ADA), mobility/counter-mobility/survivability (M/CM/S), aviation--also are provided with at least one formal AAR during the rotation. Subordinate echelons, most of the slice elements, and all special teams (eg., mortar platoon) receive field AARs immediately following the close of each mission phase.

The purpose of this report was to demonstrate the capabilities of JRTC data to address light force training issues and to present some simple analysis techniques that can be used to examine unit performance at the JRTC. The SPSS statistical procedures used in this analysis are documented in Appendix A. A list of all tasks used to demonstrate data base utility is available in Appendix B. *The following discussion does not address unit performance at JRTC. Rather the discussion is stated in terms of the process of using JRTC data sources to identify and explore performance and training issues. The discussion has been organized such that the presentation of results from a JRTC unit performance data analysis are integrated with a discussion of the data analysis process to provide an example of a step-by-step demonstration of one type of utilization of the JRTC data base.*

ANALYSIS

Scope

The first step in the analysis involved the determination of the scope of the investigation. This required:

1) The determination of the general/specific areas of training interest to be examined;
2) The selection of a sample; and
3) The identification of appropriate/available data sources.

Determine Area(s) of Interest. The JRTC data base contains a wide range of information about unit performance on the JRTC battlefield that can be used to support analyses of a variety of training issues. Ordinarily, the JRTC data base user would have identified a specific analysis goal which would determine the parameters of the investigation at the outset of the research. However, since this analysis was conducted as a general demonstration of the facility of use of the JRTC data base, the primary area of interest was the scope, functionality, and usability of JRTC data -- the particular training area to be examined was not a specified requirement. For this reason, the "area of interest" selection criteria were based on a number of considerations that were more associated with use of the (thus far untested) JRTC data base than the exploration of a definite training issue.

In order to explore the JRTC data's capability to support both snapshot and trendline analyses, the area of training interest was required to be broad enough to demonstrate performance trends across a specific domain without precluding the examination of finite issues. Additionally, the dynamics of JRTC T&EO development had to be considered. That is to say, the T&EO development process causes fluctuation in both the content and the numbers of subtasks and/or subtask standards that are associated with a task for each rotation. In order to compensate for the continuous development, modification, and refinement of JRTC T&EOs during the first eighteen months of JRTC operation, the area of training interest was limited to the defensive phase of training. "Conduct of defense" was selected as the particular mission phase to be examined because the characteristic set of T&EOs used to evaluate units during defensive operations was deemed to be the most stable over time (i.e., underwent the least extensive modification).

Select Sample. Once the general area of training interest had been determined, the sample rotations were selected. There were ten (10) JRTC rotational data files which spanned the period November 1987 through February 1989 available for the analysis. The initial JRTC rotation (FY881A) was eliminated due to the sparseness of data and the lack of a characteristic T&EO

set. Two Ranger units (rotations) were also excluded from the
prospective sample because they did not conduct a defense at
JRTC. The sample ultimately was comprised of the seven
remaining rotations.

Identify Appropriate/Available Data Sources. Table 1 lists
the various types of information generated and/or collected by
all JRTC data sources.

Table 1.

JRTC Data Sources

Data Type	Data Source	Data Format (a)
T&EO Checklists	O/C Team	Floppy disk
Checklist Comments and Annotations	O/C Team	Floppy disk
BDA (Personnel & Equipment)	O/C Team EMCC Staff (b)	Floppy disk and paper (THP, EMCC Logs)
Firing Data	O/C Team EMCC Staff	Floppy disk and paper (THP, EMCC FS Logs)
Narrative Summaries of Unit Performance	O/C Team	Floppy disk and paper (THP)
Radio Transmissions	EMCC Staff	Paper (EMCC Logs)
AAR Data	O/C Team	Video tape and paper (AAR slides)
Scenario Documents	EMCC Staff	Paper
I-MILES Data (Crew-served weapons)	I-MILES Instrumentation (O/C Team)	Floppy disk (c)

a. All data on floppy disk are available in ASCII format which
    can be translated into a variety of word processing and
    statistical software packages.
b. Exercise Management and Control Center (EMCC) Personnel.
c. I-MILES data are generated and stored in dBase III ASCII
    format and is used with customized software developed by
    the Testing & Experimentation Command (TEXCOM).

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After the general area of training interest and the sample had been determined, the JRTC data sources appropriate to the analysis were identified and consolidated. Computerized T&EO checklist information, personnel battle damage assessments, and weapon system firing data were the three primary sources of data selected to support the analysis. Selected portions of JRTC unit take home packages also were used to provide narrative descriptions of defensive operations and generally supplement the computerized data.

T&EO Checklist Data. The majority of data generated by O/Cs are collected on the JRTC battlefield through use of T&EO-based O/C checklists. The O/C checklists used at JRTC are comprised of a set of T&EO tasks (in checklist format) which delineate the particular mission phase being conducted (eg., defense). They are filled out by the O/Cs at the close of each training exercise and forwarded to Data Management where they are entered into the automated data base system. Table 2 lists the types of data available in the T&EO checklist data files to include variable names and descriptions of the type of information represented by each category of variable.

Table 2.

JRTC O/C Checklist Data Files

File Contents	Variable Name	Data Description
O/C Checklist Assessments	LISTID	Checklist identification code
	ROTID (a)	Rotation identification code
	UNITID (a)	Unit identification code
	SLICEID	Slice identification code
	ELEMENT (a)	Echelon identification code
	PHASE (a)	Phase/mission
	AARDATE (a)	Date of AAR for the phase
	DATEMOD	Date of last modification of associated T&EO task
	OPSYS	Operating system associated w/task
	TASK	T&EO task number
	SUBTASK	Associated subtask number
	TASKN	Total number of subtasks associated w/task
	SUBSCORE	GO/NO GO assessment assigned to subtask
	STS1 to STS45	GO/NO GO assessment assigned to associated subtask standards

a. Keyword variables that are common across T&EO, BDA, and fire data files.

T&EO tasks are derived totally from Army doctrine to include:

- FM 25-100 "Training the Force" (1988);

- FM 7-72 "Light Infantry Battalion" (1986);

- FM 7-71 "Light Infantry Company" (1987);

- FM 7-70 "Light Infantry Platoon/Squad" (1986);

- ARTEP 7-8-MTP "Mission Training Plans (MTP) for the Infantry Rifle Platoon and Squad" (1988); and

- TRADOC Regulation 310-2 "Design, Development, Preparation, and Management of ARTEP Documents (Mission Training Plans and Drill Books)" (1986).

T&EOs have been developed for all Battlefield Operating Systems (BOS) by echelon as well as for the various other elements which participate in JRTC training (eg., U. S. Air Force Close Air Support (CAS), Army aviation). Currently, there are approximately 360 T&EOs in use at JRTC.

Battle damage assessments (BDA). In addition to O/C checklist data, O/Cs collect battle damage assessments for unit personnel and equipment. Table 3 shows the types of data available in the personnel and equipment BDA data files.

Firing data. Firing data are collected by weapon system for each mission. Data are collected for all weapon systems employed during each mission phase. Table 3 also shows the types of firing data available for each rotation.

Take Home Packages. An O/C-generated archive of unit training is provided to each task force at the close of the rotation (the JRTC Take Home Package). THPs contain a broad spectrum of information about each unit's performance to include written descriptions of mission execution, O/C assessments of unit performance against T&EO standards, and various supporting BDA statistics. Table 4 lists the types of data included in the JRTC Take Home Package.

Other Data Sources. In addition to the above described data sources, there are numerous other data sources (see Table 1, p. 4). However, the following analysis utilizes only the T&EO checklist, BDA, firing, and THP data files discussed above.

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Table 3.

JRTC BDA and Firing Data Files

File Contents	Variable Name	Data Description
BDA (personnel)	ROTID (a)	Rotation identification code
	UNITID (a)	Unit identification code
	FORCE (a)	Type of force (OPFOR/BLUFOR)
	PHASE (a)	Mission phase
	ELEMENT (a)	Echelon identification code
	AARDATE (a)	Date of AAR for the phase
	PSTART	Personnel available at start
	KIA	No. personnel killed in action
	WIA	No. personnel wounded in action
	DOW	No. personnel died of wounds
	CAP	No. personnel captured
	PCTKIA	Percent personnel KIA
	PCTWIA	Percent personnel WIA
	TOTCAS	Total percent casualties
BDA (equipment)	ROTID (a)	Rotation identification code
	UNITID (a)	Unit identification code
	FORCE (a)	Type of force (OPFOR/BLUFOR)
	PHASE (a)	Mission phase
	ELEMENT (a)	Echelon identification code
	AARDATE (a)	Date of AAR for the phase
	WEAPON	Weapon identification code
	START	Number weapons started
	DAMAGED	Number damaged
	DESTROY	Number destroyed
	PCTLOST	Percent equipment lost
Firing data	ROTID (a)	Rotation identification code
	UNITID (a)	Unit identification code
	FORCE (a)	Type of force (OPFOR/BLUFOR)
	PHASE (a)	Mission phase
	AARDATE (a)	Date of AAR for the phase
	WPNSYS	Weapon system firing mission
	MISSIONS	No. of missions fired
	EFFECT	No. effective missions
	KIA	No. personnel KIA
	WIA	No. personnel WIA
	START	No. rounds available at start
	EXPEND	No. rounds expended
	FRAT	No. of fratricides
	VKILL	No. vehicles killed
	TKILL	No. tanks killed
	CAS	Total casualties

a. Keyword variables that are common across T&EO, BDA, and fire data files.

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Table 4.

JRTC Take Home Package Data

Data Type	Data Description
TF Mission Summaries (Annex A)	- Mission standards with GO/NG assessments for each mission phase - Narrative summary of mission execution for each mission - System summary for mission phase includes "Trained" (T), "Needs Practice" (P), "Untrained" (U) assessments for each BOS - Personnel and Equipment BDA for each mission
TF Trends (Annex B)	- System critical tasks with T, P, and U assessments for each BOS - Narrative discussion of unit strengths and areas in need of improvement
Company, Battery, and Platoon Trends (Annex C)	- Critical tasks with T, P, and U assessments for companies, battery, and special platoons - Narrative discussion of strengths and weaknesses for companies, battery, and special platoons
CS and CSS Slice Element Trends (Annex D)	- Narrative discussion of strengths and weaknesses for CS and CSS slice elements (includes home station training recommendations)
Aviation (Annex E)	- Critical tasks with T, P, and U assessments for aviation element - Narrative discussion of strengths and weaknesses for individual aviation elements (includes home station training recommendations)
AAR Video List (Annex F)	- Complete list of AAR video tapes

Data were extracted from T&EO checklist, BDA, and firing data files for defensive operations across seven (7) rotations as described above. Individual TFs were coded to preserve anonymity and the data were subjected to a number of statistical operations. The primary analysis was conducted using data across all echelons and slices in order to portray general TF performance in the defense. A second analysis also was conducted using only fire support data.

Data Base Preparation

The preparation of JRTC data for this analysis involved several procedures which facilitated computerized data manipulation and the generation of statistics across multiple rotations within the constraints of a Zenith Z-248 personal computer (PC) with 20MB hard disk (i.e., the Army standard personal computer). In order to facilitate data manipulation and statistical programming, the individual T&EO data files from the 7 sample rotations were concatenated to produce a single data file. Due to the large size of the individual T&EO data files, the concatenated file was approximately 4,000,000 bytes in length. In order to enhance the programming process and eliminate the data processing time lags that occur when extremely large files are manipulated on a PC, the data were subjected to a number of procedures which filtered out all but those data associated with defensive operations (i.e., the area of training interest). The resulting "analytic" T&EO data file was considerably more manageable (480,000 bytes). Appendix A contains the step-by-step process which resulted in the final analytic data file. In addition to the T&EO data files, personnel BDA and firing data computerized data files were also concatenated for the 7 sample rotations. However, due to their small size (approximately 22,000 bytes each) the BDA and firing data files were not subjected to further manipulation (filtering). All data file preparation and statistical analyses were conducted on a Zenith Z-248 PC using the Statistical Package for the Social Sciences (SPSS). All SPSS file manipulation and statistical processes used in this analysis also are presented in Appendix A.

Select Analysis Criteria

Indicators of Performance. Four measures were selected as meaningful indicators of difference in TF performance. The measures were selected based on their capacity to delineate differences in performance and for their availability in the data base. The first indicator, **"Subtask Score" (SUBSCORE)**, represents the O/C assessment of unit performance for each subtask associated with a task. For example, in the JRTC defensive phase, one of the tasks evaluated is T&EO Task 10: "Conduct a Defense (Battalion)." This task has thirty-eight (38) subtasks in its current configuration (see Appendix C). Each of the 38 subtasks receives an assessment from O/C observers (i.e., a SUBSCORE) based on the unit's performance of the subtask standards which support individual subtasks.

Subtask assessments are currently designated as GO or NO GO. However, in early rotations (FY881A through FY885), subtask assessments were designated as Trained (T), Needs Practice (P), or Untrained (U). For the purpose of this analysis, subtask assessments extracted from rotations using T, P, and U assessments were recoded to reflect the GO / NO GO assessments of later rotations thus enabling statistical

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comparisons across a larger number of rotations. Recoding involved the aggregation of T and P assessments to delineate a GO. U assessments were relabled as NO GO. The aggregation of T and P was conducted based on information from JRTC that current O/C practice is to designate Trained or Needs Practice assessments (T and P respectively) as GO and to designate Untrained assessments (U) as NO GO. The SUBSCORE indicator (SUBSCORE = number of GO assessments/100) was used for both the TF and fire support analyses. Table 5 presents a sample of the subtasks and subtask standards assessed for Task 10 (Conduct a Defense).

Table 5.

Sample T&EO Subtasks and Subtask Standards

Task Component	Description
Task 10:	Conduct a Defense (Battalion)
Subtask 1:	The commander planned the positioning of the TF to take advantage of:
Subtask Standard 1:	Observation and fields of fire
Subtask Standard 2:	Cover and concealment
Subtask Standard 3:	Key terrain
Subtask Standard 4:	Avenues of approach
Subtask 2:	A thorough recon is conducted down to platoon leader level before the unit occupies their defensive positions
Subtask 3:	The battalion adheres to priorities of work
Subtask 4:	Local security is established
...	...
...	...

The second indicator, **"Total Percent of Personnel Casualties" (TOTCAS)**, represents the percentage of BLUEFOR and OPFOR personnel killed and wounded in action (TOTCAS = number KIA + number WIA / 100 for each force). Because of the small number of cases recorded at the company and platoon levels, TOTCAS was not analyzed for echelons below the TF level.

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The third measure, **"Number of Rounds Expended by Weapon"** **(EXPEND)**, consists of the average number of rounds expended by selected BLUEFOR weapons (i.e., 105MM Howitzer, 155MM Howitzer, 60MM Mortars, and 81MM Mortars) during the defensive phase (EXPEND = number rounds expended / number of fire missions). Close air support (CAS) and AT weapons were not included in the analysis because of the small number of cases available. There currently is no provision/capability for collecting data on direct fire weapons/weapon systems.

The fourth indicator of difference in unit performance, **"Subtask Standards" (STS)** -- i.e., the standards by which each individual subtask is assessed (see Appendix C) -- was analyzed for selected tasks in the area of fire support (STS = number GO assessments/100).

Table 6 provides a list of the attributes of each of the four indicators used in the analysis.

Table 6

Indicators of Performance

Indicator Name (a)	Data Source	What is Measured	Echelon Measured (b)
SUBSCORE	O/C Checklist Data Files	Subtask Assessments (GO / NO GO)	- Bn TF - Company - Platoon
TOTCAS	Personnel BDA Data Files	% Total BLUEFOR and OPFOR Casualties	- Bn TF - Motorized Rifle Bn (+)
EXPEND	Fire Data Files	Number of Rounds Expended by Weapon System	
STS	O/C Checklist Data Files	Subtask Standard Assessments (GO / NO GO)	- Company - Platoon

a. The actual JRTC data file variable names have been used for each indicator.
b. Refers only to those echelons analyzed in this report.

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RESULTS

This section presents the outcomes of the application of SPSS frequency distribution procedures (i.e., "FREQ" and "CROSSTAB") to each of the four indicators of performance: SUBSCORE, TOTCAS, EXPEND, and STS. Information is presented such that the most general findings (i.e., overall TF performance) are depicted first. The more specific results (i.e., the FS BOS and company level fire support performance) are discussed last.

Task Force Performance

SUBSCORE. Figure 1 shows the percentage of GO subtask assessments received by sample TFs across all T&EO tasks performed in the defense. As described above, the SUBSCORE measure represents the performance assessment assigned by O/Cs at the T&EO subtask level for all tasks performed during defensive operations and is expressed in the figure in terms of percent GO. The distribution is by TF and the data represent T&EO assessments for all echelons and slice elements participating in the conduct of the defense.

CONDUCT A DEFENSE
Subtask Assessments Across
Seven (7) Rotations

% SUBTASKS GO

n=2437 (Across all rotations.)
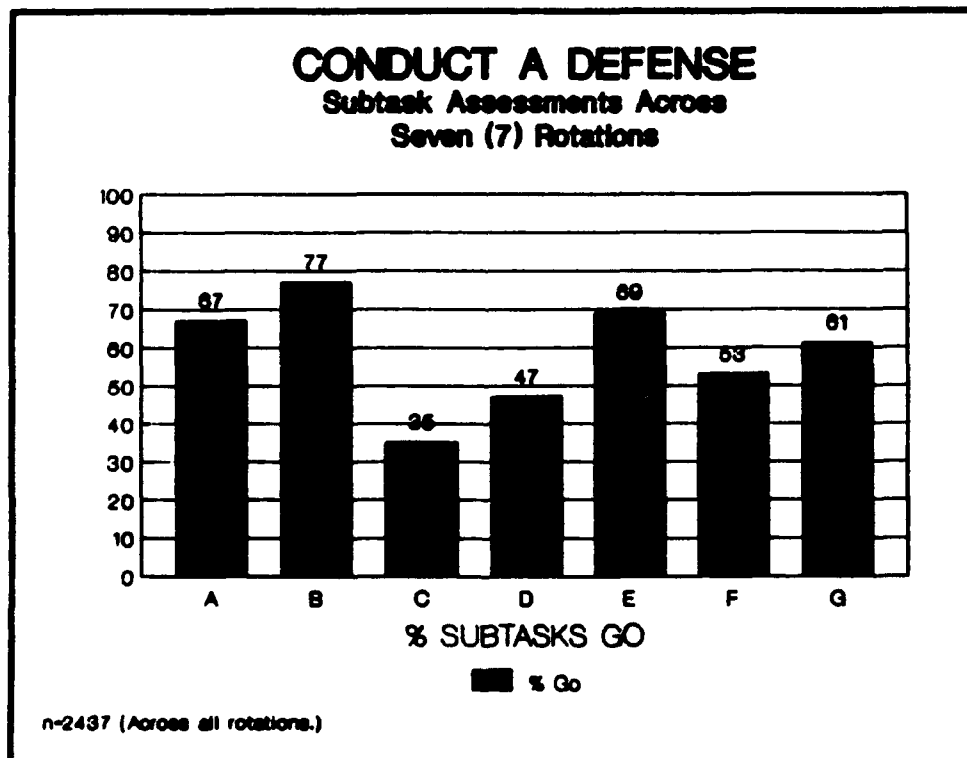
Figure 1. Task Force %GO SUBSCORE Assessments in the Defense.

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Figure 2 presents the same SUBSCORE assessments distributed across TFs by BOS.
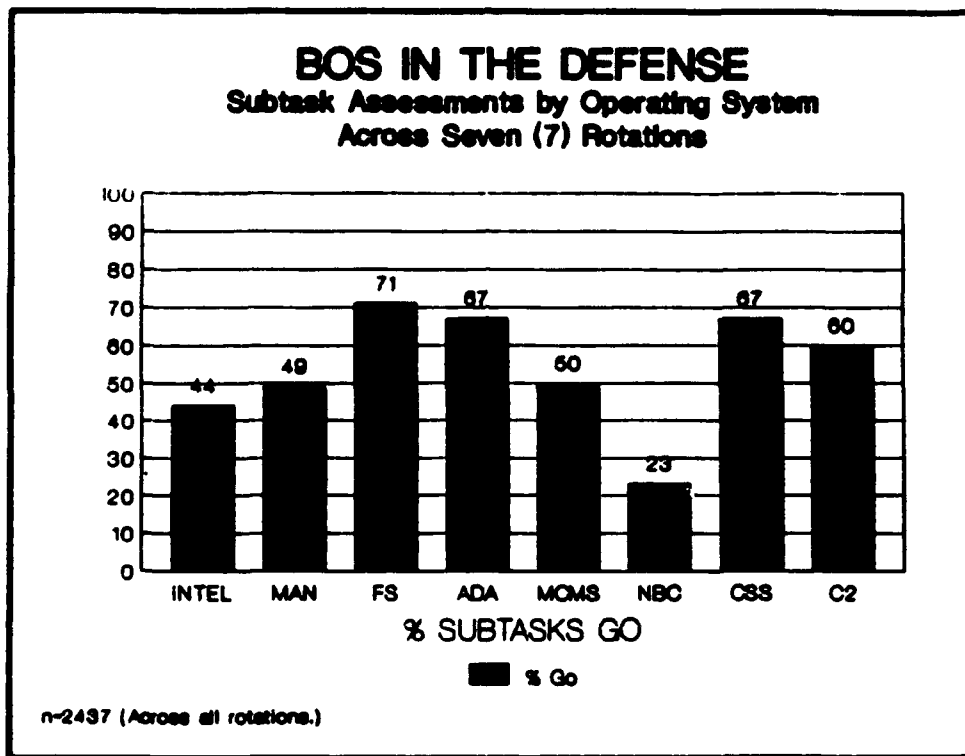
Figure 2.   Task Force %GO by BOS in the Defense.

The SUBSCORE assessments represented in Figures 1 and 2 represent a very broad assessment of TF performance.   The TF average on the SUBSCORE measure is fifty-eight percent (58%) GO. The average BOS SUBSCORE rating across the sample group is fifty-four percent (54%) GO. TF performance shortfalls suggested by the SUBSCORE measure are supported by the descriptive summaries and assessments of performance against mission standards denoted in the unit take home packages. Table 7 shows that TFs achieved low overall ratings on the defensive mission (data extracted from JRTC Take Home Packages, Annex A). TFs averaged only 43% GO across defense mission standards and six of the seven TFs received an overall NO GO on the defensive mission.

Table 7

THP Assessments: Conduct a Defense (a)

Mission Standard	A	B(b)	C	D	E	F	G
					Sample TFs		
A sound tactical plan is prepared & issued incorporating all specific & implied tasks IAW FM101-5/Ch. 6 & 7.	NG	NG	NG	NG	NA	NA	NA
The unit is task organized, equipped, supplied, rehearsed, & prepared to execute the mission at the time/place specified in the order.	NG	G	NA	NA	NA	NA	NA
The unit maintains security throughout the operation.	NG	NG	NG	NA	NA	NA	NA
The unit does not sustain casualties by friendly fire.	G	NG	NG	NG	NG	NG	NG
The unit sustains no more than 2% "died of wounds" casualties due to improper treatment or medevac procedures.	G	G	G	G	NG	NG	NG
The unit destroys, captures, or renders ineffective enemy personnel or equipment IAW the commander's intent. (c)	NG	G	NG	NG	NG	NG	NG
The unit executes movement techniques IAW FM 7-10 or FM 7-71 and FM 7-72.	G	G	NG	NA	NA	NA	NA
The unit establishes and maintains command & control throughout the operation.	G	G	NG	NA	NA	NA	NA

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Table 7 - Continued.

THP Assessments: Conduct a Defense (a)

	Sample TFs						
Mission Standard	A	B(b)	C	D	E	F	G
The unit sustains no more than 30% casualties during defensive operations.(d)	G	G	G	G	NG	G	G
The unit is prepared for follow-on missions.	NA	NA	NA	G	G	G	G

a. THP assessments have been recoded where appropriate to reflect GO/NO GO ("G" / "NG") rather than T/P/U. See discussion on pages 9 and 10 of this report. "NA" signifies that data was not available.
b. TF "B" received a GO (i.e., "P") for the mission.
c. Standard was modified for rotations D, E, F, and G. Modified standard is as follows: The unit defeats the enemy, prevents the enemy from achieving his objectives, causes the enemy attack to fail, gains time, and controls essential terrain IAW the mission and the commander's intent.
d. Standard was modified for rotations D, E, F, and G. The modified standard sets casualties at 25%.

TOTCAS. Table 8 presents the personnel battle damage assessments for TFs in the defense. As can be seen in the table, all but one task force (i.e., TF E) met the mission casualty standard by sustaining less than 30% total personnel casualties (see footnote "d" above). The table also shows that TFs consistently inflict higher casualties on the OPFOR than they sustain themselves.

Table 8

TF Personnel Casualties in the Defense

Rotation	Force	Started	KIA	WIA	DOW	TOTCAS
A	BLUEFOR	1064	33	102	3	13%
A	OPFOR	347	73	38	NA(a)	32%
B	BLUEFOR	498	29	52	5	16%
B	OPFOR	205	41	45	NA	42%
C	BLUEFOR	393	23	37	4	15%
C	OPFOR	147	56	30	NA	59%
D	BLUEFOR	571	16	40	7	10%
D	OPFOR	274	62	32	NA	34%
E	BLUEFOR	592	81	126	12	35%
E	OPFOR	233	40	49	NA	38%
F	BLUEFOR	561	39	69	21	19%
F	OPFOR	NA	NA	NA	NA	NA
G	BLUEFOR	499	28	91	12	24%
G	OPFOR	281	64	47	NA	40%

a. "NA" signifies that data was not available.

EXPEND. Table 9 presents indirect fire data for the defensive mission distributed across four weapon systems by task force:

1) 105MM Howitzer
2) 155MM Howitzer
3) 60MM Mortar
4) 81MM Mortar

Three types of data are displayed in the table. The TF code is shown in the leftmost column followed by a percentage in parentheses -- eg., A (89%). The percentage represents the TF's SUBSCORE (percent GO) calculated from T&EO checklist data for the Fire Support (FS) BOS in the defensive mission phase. The next four columns list the average number of rounds per fire mission by weapon system. The rightmost three columns show the O/C ratings of the FS BOS as they appear in the unit's take home package. It is interesting to note that although most task forces received comparatively high SUBSCORE assessments on the T&EO fire support subtasks (leftmost column), all but one TF received a NO GO in the execution of indirect fires (rightmost column). Indirect fire data (i.e., numbers of rounds) are

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difficult if not impossible to interpret without a record of indirect fire effectiveness. Additionally, these data become ore obscured in light of the T&EO assessments.

Table 9

Indirect Fire Data

TF(b)	Average # Rounds Per Fire Mission				THP Fire Support BOS Assessment (a)		
	105MM	155MM	60MM	81MM	Plan	Prepare	Execute
A (89%)	47	33	6	7	GO	GO	NG
B (74%)	18	28	19	18	GO	GO	GO
C (46%)	8	31	NA(c)	10	NG	NG	NG
D (79%)	11	12	11	4	GO	GO	NG
E (76%)	36	21	16	10	GO	NG	NG
F (83%)	15	19	6	6	GO	GO	GO
G (67%)	NA	NA	NA	NA	GO	NG	NG

a. THP assessments have been recoded where appropriate to reflect GO/NO GO ("G" / "NG") rather than T/P/U. See discussion on pages 9 and 10 of this report.
b. (Percentage) represents the overall TF SUBSCORE (% GO) for sixteen Fire Support BOS tasks (see discussion below).
c. "NA" signifies that data was not available.

The Fire Support BOS

Given the apparent anomaly in the data in Table 9 (i.e., relatively high T&EO SUBSCOREs for the fire support BOS and NO GO ratings in fire support execution), the most obvious next step in the analysis was to re-examine the T&EO fire support data with a more specific focus. Table 10 presents the SUBSCORE distribution across fifteen (15) T&EO fire support tasks.

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Table 10

Subtask Assessments (SUBSCOREs) Across Fire Support BOS

TF Percent GO

Task Description	A	B	C	D	E	F	G
- Plan/develop/communicate tentative/final TF FS plan (TSK 626-BN)	100	71	86	100	100	60	25
- Prepare initial FS plan in support of maneuver plan (TSK 627-BN)	NA(a)	NA	NA	57	71	83	57
- Execute FS plan in support of maneuver plan (TSK 628-BN)	75	100	40	75	50	75	50
- Develop & communicate a tentative/final CO FS plan (TSK 630-Co)	60	88	NA	NA	NA	NA	NA
- Communicate final CO FS plan/prepare FS assets to execute plan in support of maneuver combat operations (TSK 631-Co)	0	29	NA	NA	NA	NA	NA
- Execute company FS plan in support of maneuver plan (TSK 632-Co)	67	50	NA	NA	NA	NA	NA
- Plan, prepare, execute Co FS plan (TSK 633-Co)	NA	NA	13	63	100	57	17
- Conduct tactical movement (TSK 686-FA Btry)	100	100	67	100	57	100	38
- Conduct battery operations (TSK 688-FA Btry)	100	77	23	83	73	100	55
- Provide tactical/technical fire direction support (TSK 689-FA Btry)	100	71	63	100	100	100	100
- Combat Service Support (TSK692-FA Btry)	100	83	83	100	100	100	100
- Provide battery defense (TSK 696-FA Btry)	100	0	0	100	0	50	0
- Plan to support TF combat operations (TSK 705-Mortar Plt)	100	88	100	33	67	100	87
- Prepare for combat operations (TSK 706-Mortar Plt)	80	80	20	80	90	64	86
- Provide fire support to TF (TSK 707-Mortar Plt)	100	100	13	100	57	75	75

a. "NA" signifies that data was not available.

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Since this analysis strives to demonstrate JRTC data base utility, the next logical step in the analysis was to examine the data at the next lower level of detail in order to identify (if possible) the source of the seeming contradiction between the *low* fire support operating system assessments -- extracted from unit THPs -- and the comparatively *high* overall (i.e., task force level) fire support T&EO SUBSCOREs shown in Table 9. As can be seen in Table 10, a number of the low T&EO SUBSCORE assessments occurred across the sample rotations at the company echelon (i.e., Tasks 631, 632, and 633). For this reason, the low company fire support ratings were singled out as potential pointers to the origin of the poor THP ratings.

Company Echelon Fire Support

STS. As previously discussed, the "fit" between tasks, subtasks, and subtask standards across T&EO checklist tasks during the period under investigation was less than complete because of the continuous effort to improve T&EOs and correlate them to Army Mission Training Plans (AMTPs) as they became available. This poor T&EO "fit" is one of the most persistent data analysis inhibitors identified during the course of this analysis. Table 11 shows the commonalty between subtasks (SUBSCOREs) and subtask standards (STSs) for the company echelon fire support tasks (Tasks 630, 631, 632, and 633) during the period under investigation. The table was constructed by comparing Tasks 630-632 (circa rotations A and B) with Task 633 (circa rotations C through G) at the subtask and subtask standard level and matching subtasks and subtask standards where applicable. The results are presented within the framework of Task 633 which encompassed and replaced the earlier Tasks 630-632.

Table 11

Comparison of T&EO Tasks 630, 631, 632, and 633: Plan, Prepare, and Execute a Company Fire Support Plan (a)

SUBSCORE/ STS (b)	Task Match (c)	Subtask/Subtask Standard Description
SUBSCORE 1	630/S1	Company FSO develops a company FS plan.
STS1	630/S1/STS1	The FSO understands the company's mission, Cdr's intent, & specified and implied tasks.
STS2	630/S1/STS4	The FSO identifies mission essential tasks.
STS3	630/S1/STS5	The FSO determines the constraints on fire support assets.

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Table 11 - Continued.

Comparison of T&EO Tasks 630, 631, 632, and 633: Plan, Prepare, and Execute a Company Fire Support Plan (a)

SUBSCORE/ STS (b)	Task Match (c)	Subtask/Subtask Standard Description
STS4	630/S2/STS1	The FSO coordinates with the BN FSO, Plt FOs, & 60mm section sergeant.
STS5	No Match	The fire support plan supports the Cdr's intent and scheme of maneuver.
STS6	631/S3/STS2	The plan contains sufficient targets & control measures to accomplish the mission.
STS7	631/S3/STS3	The FS plan and execution matrix are IAW FM 6-20-50 and FC 6-20-20.
SUBSCORE 2	631/S1	Prepare to support operations.
STS1	631/S1/STS2	Did all elements rehearse the plan?
STS2	632/S3/STS5	Was the plan adjusted to support changes in the maneuver plan?
STS3	No Match	Were the plan and matrix forwarded to the BN FSE & 60mm mortar section?
SUBSCORE 3	No Match	Execute the FS plan.
STS1	632/S1/STS1	Was commo maintained with the Cdr, TF FSO, Plt FOs, mortars, DS BN, and Btry FDCs?
STS2	632/S1/STS2	Were changes in the plan forwarded to the BN FSE?
STS3	632/S3/STS3	Was the execution matrix followed?
STS4	632/S3/STS5	Fires are shifted as the battle develops.
STS5	632/S3/STS9 and STS10	Indirect fire into or near the company sector is cleared by the company FSO.
STS6	632/S3/STS4	Priority fires are to the designated element.
STS7	632/S3/STS7	The company FSO keeps the commander informed.
STS8	632/S2/STS3	Major changes in the plan are approved by the company Cdr.
STS9	632/S3/STS1	Special munitions are employed as needed or directed.
STS10	No Match	The company FSO coordinates platoon FO activities.
STS11	No Match	Priority targets are shifted as the company maneuvers.
STS12	632/S3/STS7	The company FSO keeps the BN FSO informed.

Table 11 - Continued.

Comparison of T&EO Tasks 630, 631, 632, and 633: Plan, Prepare,
and Execute a Company Fire Support Plan (a)

SUBSCORE/ STS (b)	Task Match (c)	Subtask/Subtask Standard Description
SUBSCORE 4	632/S1/STS1	Assets are continually coordinated.
STS1	No Match	The company FSO looks ahead to facilitate future operations.
STS2	632/S1/STS2 and STS5	Reports are submitted as required.
STS3	No Match	All requests for fire support are monitored.

a. SUBSCORE and STS information is presented within the context
    and format of Task 633.
b. SUBSCORE = Subtask / STS = Subtask Standard.
c. Tasks 630, 631, and 632 are matched to Task 633 by identi-
    fying the applicable subtask and/or subtask standard in the
    earlier tasks -- eg., Subtask 1 (SUBSCORE 1) in Task 633
    matches Subtask 1 (SUBSCORE 1) in Task 630 and is
    represented above as "630/S1." Subtask Standard 1 (STS1)
    under Subtask 1 (SUBSCORE 1) in Task 633 matches Subtask
    Standard 1 under Subtask 1 in Task 630 and is represented as
    "630/S1/STS1" in the table.

     Once the SUBSCOREs and STSs for the various company fire
support tasks across all sample rotations had been consolidated
into the Task 633 format, a cross tabulation was performed to
determine STS scores for companies across the task. Table 12
shows the STS assessments extracted from O/C T&EO checklist data
for the company fire support task(s).

     The data in Table 12 show that companies in five of the
seven TFs received a 100% GO rating on SUBSCORE 1 ("Company FSO
develops a FS plan"). SUBSCORE 1 ratings (Company average=84%
GO) generally reflect the high assessments assigned to the
overall FS BOS under "Planning" in unit THPs (see Table 9).

     The SUBSCORE 2 ("Prepare to support fire support opera-
tions") ratings show A 36% average score for FS preparation.
Companies in TFs B and E did receive 100% GO SUBSCORE ratings
but the supporting data (i.e., STS scores) were either missing
or generally did not reflect the 100% GO at the SUBSCORE level.
The "O/C Comment" files were checked to determine whether
SUBSCORE 2 or its associated STS ratings were annotated in an

Table 12

T&EO Assessments for Company Fire Support (Task 633)

		Percent GO by Task Force					
T&EO Variable Name (%GO)	A	B	C	D	E	F	G
SUBSCORE 1 (84)	**100**	**100**	**33**	**100**	**100**	**100**	**50**
STS1 (81)	100	100	67	100	100	50	50
STS2 (83)	50	67	67	100	100	100	100
STS3 (83)	100	67	67	50	100	100	100
STS4 (52)	100	33	33	100	100	0	0
STS5 (67)	a	a	33	100	100	50	50
STS6 (47)	NA	NA	33	50	NA	50	50
STS7 (40)	NA	NA	0	50	100	50	0
SUBSCORE 2 (36)	**0**	**100**	**0**	**50**	**100**	**0**	**0**
STS1 (17)	0	0	0	100	NA	0	0
STS2 (33)	0	NA	0	50	0	50	100
STS3 (60)	a	a	0	0	100	100	100
SUBSCORE 3 (50%	**a**	**a**	**0**	**50**	**100**	**100**	**0**
STS1 (36)	0	50	0	0	100	0	100
STS2 (60)	100	50	0	50	100	NA	NA
STS3 (33)	0	NA	0	0	100	100	0
STS4 (42)	0	NA	0	50	0	100	100
STS5 (67)	100	NA	0	0	100	100	100
STS6 (75)	100	NA	0	50	100	100	100
STS7 (58)	0	NA	0	50	100	100	100
STS8 (50)	0	50	NA	50	100	100	0
STS9 (100)	NA	NA	NA	NA	100	100	NA
STS10 (88)	a	a	NA	50	100	100	100
STS11 (100)	a	a	NA	100	NA	100	100
STS12 (67)	a	a	NA	100	100	0	NA
SUBSCORE 4 (42)	**0**	**50**	**NA**	**50**	**100**	**50**	**0**
STS1 (63)	a	a	NA	50	100	100	0
STS2 (67)	50	50	NA	100	100	100	0
STS3 (38)	a	a	NA	0	100	50	0

a.   Indicates that there is no clear match between Tasks 630-632 and Task 633 and therefore no appropriate data for TFs A and B.   NA indicates that there is a match but data are missing (i.e., not collected) for the item.

attempt to provide some explanation for the 100% GO ratings for companies in TFs B and E, however, there was no noteworthy annotation.   It is important to remember here that SUBSCOREs are generated based on the tabulation of their associated STS scores <u>and</u> the expert judgement of the O/C assessing the task.   The

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lack of supporting T&EO data for TFs B and E SUBSCORE 2 ratings illustrates the need for O/Cs to better annotate their judgement calls. The O/C Comment file (which contains supporting annotations to checklist assessments) yielded no explanation for the missing and/or conflicting scores.

SUBSCORE 3 ("Execute the FS plan") also presents some seemingly conflicting data which requires annotation for clarification. For example, the companies in TF G received a SUBSCORE 3 rating (0% GO). This is difficult to analyze given that the companies averaged 78% GO on the associated STS ratings. On the other hand, the companies in TF F received a 100% GO rating on SUBSCORE 3 which is supported at the STS level by an 82% GO. Once again, the O/C Comment file provided no explanation for the difference in SUBSCORE assessments between the companies in these two TFs. Another analytic difficulty occurs with the company ratings for TF B. Much of the data that support SUBSCORE 3 for TF B company fire support are missing (i.e., were not collected/recorded). Since the SUBSCORE 3 rating for the companies in TF B is the equivalent of the entire Task 632 which is not rated as such, there is no SUBSCORE 3 rating available for TF B's company FS execution. While the TF B'S company level fire support execution assessments do not constitute the entire data available for the investigation of unit performance in the FS BOS, the fact that TF B received a GO for fire support execution at the TF level (see Table 9) makes these data (or lack of same) somewhat more meaningful.

SUBSCORE 4 ("Assets are continually coordinated") ratings appear to be in line with their supporting STS scores.

CONCLUSIONS

Although this analysis was performed only as a demonstration of JRTC data base utility and it yielded very broad results with regard to unit performance in the conduct of defense on the JRTC battlefield, the process of preparing and analyzing the data extracted from the ARI-POM JRTC data base archive produced a number of illustrations of both the positive and negative aspects of the: (1) scope; (2) usability; and (3) functionality of JRTC data.

Scope. The scope of JRTC data currently available to analysts is extremely broad. Although the JRTC does not have the capability to collect and record player position/location (P/L) information like that collected at NTC, JRTC data does encompass what may be called the "CTC standard set" of information (see Table 1, page 4) to include: personnel and equipment battle damage assessments; weapon system firing information; crew-served weapon system I-MILES data; and O/C assessments (THP narratives). In addition, the T&EO checklist data (which currently are collected only at JRTC) provide the potential to examine specific details of unit performance across

echelons, slice elements, special teams, operating systems, missions, and/or tasks.

Usability. For the most part, JRTC data have been organized, automated, and documented such that they can be used (in their present formats) to examine many JRTC training and/or light force training issues. However, there are a number of inhibiting factors associated with use of the data base which, while they do not preclude data analysis, may encumber analytic efforts.

A primary example of such an analytic impediment is the fluctuation in T&EO checklist data file contents over time. As discussed previously, the continuous modification and refinement of T&EO checklists has caused T&EO data files to be somewhat inconsistent from one rotation to the next. Although inconsistencies may be largely overcome by matching individual subtasks and subtask standards across a modified task (see Table 11), the process is extremely tedious and time consuming. This particular issue should become less of a hindrance as T&EOs achieve their final form and become subject to revision less frequently. However, existing data still will need to be matched across modified and replacement tasks as was done with company fire support tasks for this analysis if serious trendline analyses are to be conducted.

Another example of JRTC data base encumbrances also involves the use of automated files across rotations. While it is possible to use hard copy data file documentation to perform an analysis, the magnitude of JRTC automated data file documentation is prohibitive (eg., there are approximately 400-600 pages of file documentation per rotation). The fastest and most efficient method of manipulating the data and generating statistics to perform analyses is to use the computerized data files. Data are available in standard ASCII format and may be used with a variety of statistical packages and current file configurations allow quick data turn-around for any single rotation. However, if multiple rotations are analyzed, substantial file manipulation and data reorganization is required, especially in connection with the T&EO checklist data (see discussion under "Data Base Preparation" on page 9). This precludes T&EO checklist data use by any but skilled computer users.

Functionality. The JRTC data base includes a broad spectrum of unit performance information. The level of detail provided by T&EO subtask and subtask standard assessments when coupled with JRTC battlefield statistics (eg., personnel and equipment BDA, weapon system firing information) offers analysts the potential to examine light force unit performance in great depth. However, whether or not that potential is realized will be determined by future JRTC data collection and data management developments. The continuing modification of T&EO tasks and the persistent changes in data file organization and keyword

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identification codes make it increasingly more difficult to examine training issues over time (trendline analyses).

RECOMMENDATIONS

1. Develop a unit performance measurement system which facilitates analysis of relationships between tasks.

2. Develop a T&EO schematic that links related or matching T&EO subtasks and subtask standards across modified T&EO tasks (such as was done with Tasks 630, 631, 632, and 633 for this report).

3. Augment data collection system to require annotations in those instances where T&EO data conflict (eg., the SUBSCORE/STS anomalies discussed in connection with Table 12 above).

4. Standardize all JRTC automated data files to include:

    -   Data file formats;

    -   Keyword identification codes and variable labels;

    -   Performance assessment designations ("T""P" and "U" vs. "GO" "NO GO").

DISCUSSION

1. Develop a unit performance measurement system which facilitates analysis of relationships between tasks, subtasks, subtask standards, echelons, BOS, etc.

The scope of JRTC data is so broad and encompasses so many individual data items that the task of designing an analysis and selecting and organizing the data which will support it can be somewhat overwhelming. For the past four years, ARI-POM has been involved with the development of a unit performance measurement system (UPMS) for CTCs.

The result of this effort is a task linkage (dendritic) structure that depicts the correspondence between mission critical tasks across battlefield operating systems for battalion task force, company, and platoon echelons. The original UPMS dendritic was developed for armor and mechanized infantry units training at NTC. However, the methodology and much of the dendritic structure itself are transferrable to light force training. ARI-POM currently is conducting an effort to "crosswalk" the NTC UPMS methodology to the JRTC training environment. This involves the overlay of the existing UPMS task linkage structure (i.e., dendritic) onto JRTC (AMTP-based) T&EOs, making additions, deletions, and modifications where

appropriate to accommodate the differences between light and heavy forces and the NTC and JRTC training environments.

This type of task linkage system would be an excellent analytic tool for JRTC analysts. It would be particularly effective if the current dendritic structure was expanded for the JRTC to include task linkages across echelons and slice components (the current UPMS structure does not depict relationships across echelons). The JRTC has functioned as a test-bed for a number of innovative and thus far successful diagnostic tools (eg., T&EO checklists). The development and implementation of a JRTC UPMS would amplify both immediate feedback (i.e., AAR and THP) potential and facilitate profound post-rotational analysis of light force unit performance/-readiness.

2.   Develop a schematic that links related or matching T&EO subtasks and subtask standards across modified T&EO tasks.

T&EO subtasks and subtask standard file variables should be aligned (i.e., standardized) across tasks. Currently, in order to aggregate equivalent subtask (SUBSCORE) and subtask standard (STS) variables across rotations, analysts must perform the cumbersome matching process demonstrated with company fire support tasks in this report. A subtask/subtask standard (SUBSCORE/STS) schematic would provide a "roadmap" to equivalent variables across:

> (1)   different iterations of the same task,

> (2)   tasks which encompass and replace multiple other tasks (eg., Task 633), and

> (3)   different types of tasks

and enable T&EO data aggregation for statistical analysis across rotations (i.e., trendline analysis). A variable cross-matching tool such as the "SUBSCORE/STS schematic" developed for Tasks 630-633 in this report would facilitate the examination of a plethora of issues that currently require the analyst to have a sophisticated knowledge of data base manipulation and a substantial amount of time. To this author's knowledge, there presently is no effort underway to accomplish this task.

3.   Augment data collection system to require annotation in those instances where T&EO data do not support the performance assessment.

The dynamics of a battlefield are not easily denoted regardless of the scope of the data collection system or the rigor with which data are collected and analyzed. For this reason, the most complete assessment of unit performance on the JRTC battlefield is made by the JRTC O/Cs on the ground. Because the data that is archived represent only a part of the

unit performance assessment criteria, it is very important that
the most detailed record of unit performance (the T&EO
checklists) be annotated with O/C expert judgement.   Checklist
annotation is particularly critical when T&EO task and subtask
ratings are not supported by subtask standard assessments.   For
example, while O/C expert judgement may legitimately deem that
units performed subtask standards well and still did not succeed
in the overall performance of the subtask (or vice versa) based
upon criteria which are beyond the scope of data collection
system, the post-rotational analyst -- who has only the recorded
data to work with -- is presented with the almost impossible
task of determining why the data do not support the mission
scores and/or task ratings that have been assigned.   A
requirement for subtask or subtask standard annotation would
clarify the record and better support post-rotational analyses.

4.   Standardize all JRTC automated data files.

The current ARI-POM effort to assess the scope, usability,
and functionality of JRTC data (as represented by this report)
is drawing to a close.   The findings of this analysis indicate
that further efforts to standardize JRTC data are needed.   In
addition to the following suggested data file refinements, a
light force task linkage dendritic across all operating systems
and echelons and a schematic that links subtasks and subtask
standards across all iterations of T&EO tasks (thus linking all
rotations) would provide a foundation for the complete
standardization of JRTC data and the JRTC data base.   This type
of standardization will enhance realtime JRTC feedback
capabilities and ensure the full exploitation of all JRTC data.

Data file formats and variable string lengths.   Data file
concatenation/aggregation will be greatly enhanced if files are
formatted such that the order of variables and variable string
lengths correspond across like files (eg., rotational T&EO
checklist data files, rotational personnel BDA files, etc.).   It
is recognized that some new variables will be developed and that
some old variables will become obsolete over time.   For this
reason, the insertion, deletion, and modification of variables
should be approached systematically to ensure data file manipu-
lation capability.

Keyword identification codes.   Keyword variables (see Table
2, page 5) provide the foundation for data file manipulation in
preparation for statistical analyses.   It is critical to *both*
snapshot and trendline type analyses that keyword variables be
coded identically across all files in which they occur.   In
addition to keyword variables, it is extremely important that
all unit performance assessment variable codes be identical
across all rotations (eg., NO GO always=1 regardless of the
level of assessment).

Performance assessment designations.   Statistical analysis
of T&EO checklist and THP data is complicated by the existence

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of two different sets of unit performance assessment
designators: (1) "Trained," "Partially Trained," "Untrained,"
and (2) "GO," "NO GO." For the purpose of this analysis,
subtask assessments extracted from T&EO checklist and THP data
showing T, P, and U assessments were recoded to reflect GO / NO
GO thus enabling statistical comparisons across all available
data (see discussion on page 9). The capability to
statistically manipulate JRTC data would be notably improved by
the standardization of performance assessment designators.
Additionally, as mentioned in the above paragraph, it is
extremely important that all unit performance assessment
designator variable codes be identical across all rotations
(eg., NO GO always=1 regardless of the particular rotation or
level of assessment).

In summary, the JRTC data base includes a broad spectrum of
useful and well documented unit performance information. The
level of detail provided by T&EO subtask and subtask standard
assessments, when coupled with JRTC battlefield statistics,
offers JRTC analysts the potential to examine many light force
unit performance issues in great depth. Whether this potential
is realized depends on future JRTC data base development.

APPENDIX A   Data Base Preparation and SPSS Statistical Procedures

Data Base Preparation

1. Extract defensive phase data from rotational T&EO files (using SPSS/PC+).

SPSS Command	Comment/Description
GET FILE='FYXXX'.	- Retrieve Rotation "A" T&EO data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=1 OR SUBSCORE=2 OR SUBSCORE=3).	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=3.	- Recode "P" to "T" (i.e., GO).
SAVE FILE='TF_A'.	- Save file.

GET FILE='FYXXX'.	- Retrieve Rotation "B" T&EO data file.
SELECT IF (PHASE=2).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=1 OR SUBSCORE=2 OR SUBSCORE=3).	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=3.	- Recode "P" to "T" (i.e., GO).
SAVE FILE='TF_B'.	- Save file.

GET FILE='FYXXX'.	- Retrieve Rotation "C" T&EO data file.
SELECT IF (PHASE=4).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=1 OR SUBSCORE=2 OR SUBSCORE=3).	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=3.	- Recode "P" to "T" (i.e., GO).
SAVE FILE='TF_C'.	- Save file.

SPSS Command	Comment/Description
GET FILE='FYXXX'.	- Retrieve Rotation "D" T&EO data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=1 OR SUBSCORE=2 OR SUBSCORE=3).	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=3.	- Recode "P" to "T" (i.e., GO).
SAVE FILE='TF_D'.	- Save file.

GET FILE='FYXXX'.	- Retrieve Rotation "E" T&EO data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=1 OR SUBSCORE=2).	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=3.	- Recode 2 (GO) to 3 (GO) to maintain consistent GO/NO GO numeric codes across rotations.
SAVE FILE='TF_E'.	- Save file.

GET FILE='FYXXX'.	- Retrieve Rotation "F" T&EO data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=2 OR SUBSCORE=3.	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=1.	- Recode 2 (NO GO) TO 1 (NO GO) to maintain numeric code consistency across rotations.
SAVE FILE='TF_F'.	- Save file.

SPSS Command	**Comment/Description**
GET FILE='FYXXX'.	- Retrieve Rotation "G" T&EO data file.
SELECT IF (PHASE=2).	- Extract data from defensive phase.
SELECT IF (SUBSCORE=2 OR SUBSCORE=3.	- Eliminate missing and "NA" data
IF (SUBSCORE=2) SUBSCORE=1.	- Recode 2 (NO GO) TO 1 (NO GO) to maintain consistency across rotations.
SAVE FILE='TF_G'.	- Save file.

----

2.   Concatenate individual rotational "defense" files to
     establish T&EO analytic file.

SPSS Command	**Comment/Description**

JOIN ADD /FILE='TF_A'
 	
  :/FILE='TF_B'
  :/FILE='TF_C'
  :/FILE='TF_D'
  :/FILE='TF_E'.
	- Concatenate files (only 5 files may be joined at one time).

SAVE FILE='DEFEND' /COMPRESSED.	- Save file in compressed form.

JOIN ADD /FILE='DEFEND'
 	
  :/FILE='TF_F'
  :/FILE='TF_G'.
	- Continue concatenation of files.

SAVE FILE='DEFEND' /COMPRESSED.	- Save final T&EO analytic data file in compressed form.

1. Extract defensive phase data from rotational personnel BDA files.

SPSS Command	Comment/Description
GET FILE='PERSXXX'.	- Retrieve Rotation "A" BDA data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='BDA_A'.	- Save file.

GET FILE='PERSXXX'.	- Retrieve Rotation "B" BDA data file.
SELECT IF (PHASE=2).	- Extract data from defensive phase.
SAVE FILE='BDA_B'.	- Save file.

GET FILE='PERSXXX'.	- Retrieve Rotation "C" BDA data file.
SELECT IF (PHASE=4).	- Extract data from defensive phase.
SAVE FILE='BDA_C'.	- Save file.

GET FILE='PERSXXX'.	- Retrieve Rotation "D" BDA data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='BDA_D'.	- Save file.

GET FILE='PERSXXX'.	- Retrieve Rotation "E" BDA data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='BDA_E'.	- Save file.

SPSS Command	Comment/Description
GET FILE='PERSXXX'.	- Retrieve Rotation "F" BDA data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='BDA_F'.	- Save file.

SPSS Command	Comment/Description
GET FILE='PERSXXX'.	- Retrieve Rotation "G" BDA data file.
SELECT IF (PHASE=2).	- Extract data from defensive phase.
SAVE FILE='BDA_G'.	- Save file.

----

2. Concatenate individual rotational "defense" files to establish BDA analytic file.

SPSS Command	Comment/Description

JOIN ADD /FILE='BDA_A'
 	
  :/FILE='BDA_B'
  :/FILE='BDA_C'
  :/FILE='BDA_D'
  :/FILE='BDA_E'.
	- Concatenate files (only 5 files may be joined at one time).

SAVE FILE='BDA' /COMPRESSED.	- Save file in compressed form.

JOIN ADD /FILE='BDA'
 	
  :/FILE='BDA_F'
  :/FILE='BDA_G'.
	- Continue concatenation of files.

SAVE FILE='BDA' /COMPRESSED.	- Save BDA analytic file in compressed form.

1.   Extract defensive phase data from rotational FIRE data
     files.

SPSS Command	**Comment/Description**
GET FILE='FIREXXX'.	- Retrieve Rotation "A" FIRE data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='FIRE_A'.	- Save file.

GET FILE='FIREXXX'.	- Retrieve Rotation "B" FIRE data file.
SELECT IF (PHASE=2).	- Extract data from defensive phase.
SAVE FILE='FIRE_B'.	- Save file.

GET FILE='FIREXXX'.	- Retrieve Rotation "C" FIRE data file.
SELECT IF (PHASE=4).	- Extract data from defensive phase.
SAVE FILE='FIRE_C'.	- Save file.

GET FILE='FIREXXX'.	- Retrieve Rotation "D" FIRE data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='FIRE_D'.	- Save file.

GET FILE='FIREXXX'.	- Retrieve Rotation "E" FIRE data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='FIRE_E'.	- Save file.

SPSS Command	Comment/Description
GET FILE='FIREXXX'.	- Retrieve Rotation "F" FIRE data file.
SELECT IF (PHASE=3).	- Extract data from defensive phase.
SAVE FILE='FIRE_F'.	- Save file.

SPSS Command	Comment/Description
GET FILE='FIREXXX'.	- Retrieve Rotation "G" FIRE data file.
SELECT IF (PHASE=2).	- Extract data from defensive phase.
SAVE FILE='FIRE_G'.	- Save file.

---

2. Concatenate individual rotational "defense" files to
    establish FIRE analytic file.

SPSS Command	Comment/Description
JOIN ADD /FILE='FIRE_A' :/FILE='FIRE_B' :/FILE='FIRE_C' :/FILE='FIRE_D' :/FILE='FIRE_E'.	- Concatenate files (only 5 files may be joined at one time).
SAVE FILE='FIRE' /COMPRESSED.	- Save file in compressed form.
JOIN ADD /FILE='FIRE' :/FILE='FIRE_F' :/FILE='FIRE_G'.	- Continue concatenation of files.
SAVE FILE='FIRE' /COMPRESSED.	- Save FIRE analytic file in compressed form.

Generation of Statistics

Figure 1:

SPSS Command	Comment/Description
GET FILE='DEFEND'.	- Retrieve file.
XTAB VAR=SUBSCORE BY ROTID /OPTIONS 3 4 5.	- Perform cross tabulation for SUBSCORE across rotations.

MORE

```
Crosstabulation:       SUBSCORE   SUBTASK SCORE
                  By ROTID       ROTATION IDENTIF

                                                          - - - - Page  1  of

              Count  3
              Row Pct 3
    ROTIDD    Col Pct 3                                          3  Row
              Tot Pct 3TF_A      3TF_B      3TF_C      3TF_D      3TF_E     3 Total
SUBSCORE   DDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
               1  3      69  3      128  3      282  3      207  3      355  3  1868
  UNTRAINED       3     3.7  3      5.9  3     15.1  3     11.1  3     19.0  3  42.4
                  3    23.1  3     32.7  3     65.0  3     38.9  3     47.0  3
                  3     1.6  3      3.0  3      6.6  3      4.8  3      8.2  3
               EDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
               3  3     230  3      263  3      152  3      326  3      401  3  2436
  TRAINED         3     9.4  3     10.8  3      6.2  3     13.4  3     16.5  3  56.6
                  3    76.9  3     67.3  3     35.0  3     61.2  3     53.0  3
                  3     5.3  3      6.1  3      3.5  3      7.6  3      9.3  3
               EDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
       Column      299         391         434         533         756        4304
(Continued) Total  6.9         9.1        10.1        12.4        17.6       100.0
```

Crosstabulation: SUBSCORE   SUBTASK SCORE
                 By ROTID   ROTATION IDENTIF

```
              Count   3
              Row Pct 3
ROTID         Col Pct 3                    3  Row
              Tot Pct 3TF_F      3TF_G     3  Total
SUBSCORE      DDDDDDDDEDDDDDDDDEDDDDDDDDE
            1  3   213  3   584  3   1868
UNTRAINED      3  13.0  3  31.3  3   43.4
               3  30.9  3  52.9  3
               3   5.6  3  13.6  3
              EDDDDDDDDEDDDDDDDDE
            3  3   543  3   521  3   2436
TRAINED        3  22.3  3  21.4  3   56.6
               3  69.1  3  47.1  3
               3  12.6  3  12.1  3
              EDDDDDDDDEDDDDDDDDE
      Column       786      1105      4304
      Total       18.3      25.7     100.0
```

Number of Missing Observations =   0

A9

Figure 2:

SPSS Command	Comment/Description
GET FILE='DEFEND'.	- Retrieve file.
XTAB VAR=SUBSCORE BY OPSYS /OPTIONS 3 4 5.	- Perform cross tabulation for SUBSCORE across BOS.

```
Crosstabulation:      SUBSCORE   SUBTASK SCORE
                   By OPSYS      OPERATING SYSTE
                                                    - - - - Page  1 of  1

           Count  3
           Row Pct 3INTELLIG3MANEUVER3FIRE SUP3ADA      3MCMS    3
OPSYSD     Col Pct 3ENCE     3          3PORT    3           3     3 Row
           Tot Pct 3      1 3       2 3       3 3      4 3      5 3 Total
SUBSCORE   DDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
                 1 3     68 3    784 3    199 3     48 3    188 3  1953
UNTRAINED          3    3.5 3   42.0 3   10.7 3    2.6 3   10.1 3  43.4
                   3   56.2 3   50.6 3   29.3 3   33.3 3   49.9 3
                   3    1.6 3   18.2 3    4.6 3    1.1 3    4.4 3
                   EDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
                 2 3     53 3    764 3    505 3     96 3    189 3  2436
TRAINED            3    2.2 3   31.4 3   20.7 3    3.9 3    7.9 3  56.6
                   3   43.8 3   49.4 3   71.7 3   66.7 3   50.1 3
                   3    1.2 3   17.8 3   11.7 3    2.2 3    4.4 3
                   EDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
           Column      121     1548      704      144      377     4304
(Continued)  Total     2.8     36.0     16.4      3.3      8.8    100.0
```

A10

Crosstabulation: SUBSCORE   SUBTASK SCORE
                  By OPSYS   OPERATING SYSTE

```
            Count   3
            Row Pct  FNBC        3CSS        3CIC        3
OPSYSD>     Col Pct  3           3           3           3   Row
            Tot Pct  3        6 3         7 3         8 3 Total
SUBSCOPE   DDDDDDDDEDDDDDDDDDEDDDDDDDDDEDDDDDDDDDE
              1  3      122  3      254  3      205  3   1868
UNTRAINED     3      6.5  3     13.6  3     11.0  3   43.4
              3     77.2  3     32.7  3     43.2  3
              3      2.8  3      5.9  3      4.8  3
           EDDDDDDDDDEDDDDDDDDDDEDDDDDDDDDE
              3  3       36  3      523  3      270  3   2436
TRAINED       3      1.5  3     21.5  3     11.1  3   56.6
              3     22.8  3     67.3  3     56.8  3
              3       .8  3     12.2  3      6.3  3
           EDDDDDDDDDEDDDDDDDDDDEDDDDDDDDDE
           Column      158         777         475      4304
            Total      3.7        18.1        11.0     100.0
```

Number of Missing Observations =   0

A11

Table 8:

SPSS Command	Comment/Description
GET FILE='PERS.DAT'.	- Retrieve file.
LIST.	- List personnel data for defensive phase for all rotations.

The VARIABLES are listed in the following order:

Line   1: PHASE RCTID FORCE UNITID AARDATE PSTART KIA WIA DOW CAP ELEMENT
          PCTKIA

Line   2: PCTWIA TOTCAS   —

```
  PHASE:  3 FY83:  1 2/22    121137 1064   33  101    3   .  1        .03
  PCTWIA:     .09        .13

  PHASE:  3 FY981  2  1/509  121187  347   73   38    .   1  0        .21
  PCTWIA:     .11        .

  PHASE:  2 FY982  1 1/9      12388  498   29   52    5   .  .        .06
  PCTWIA:     .10        .16

  PHASE:  2 FY981  2 1/509    12388  205   41   45    .   .  .        .20
  PCTWIA:     .22        .42

  PHASE:  4 FY884  1 1/115    42588  393   23   37    4   .  1        .06
  PCTWIA:     .09        .15

  PHASE:  4 FY884  2 1/509    42588  147   56   30    .   .  .        .33
  PCTWIA:     .20        .59

  PHASE:  3 FY885  1 4/9INF   80988  571   16   40    7   3  .        .
  PCTWIA:     .          .

  PHASE:  3 FY885  2 1/509    80988  274   62   32    6   6  .        .
  PCTWIA:     .          .

                                                              MORE

  PHASE:  3 FY886  1 2/327    91588  592   81  126   12   .  .        .14
  PCTWIA:     .21        .35

  PHASE:  3 FY886  2 1/509    91588  233   40   49   33   1  .        .17
  PCTWIA:     .21        .38

  PHASE:  3 FY991  1 5/14    102688  561   39   59   21   .  13       .07
  PCTWIA:     .12        .19

  PHASE:  2 FY893  1 1/22     13189  499   28   91   12   3  13       .06
  PCTWIA:     .19        .24

  PHASE:  2 FY893  2 1/509    13189  281   64   47   14   .  13       .23
  PCTWIA:     .17        .40
```

Number of cases read =   13   Number of cases listed =   13

A13

Table 9:

SPSS Command	Comment/Description
GET FILE='DEFEND'.	- Retrieve file.
SELECT IF (TASK=626 OR TASK=627 OR TASK=628 OR TASK=630 OR TASK=631 OR TASK=632 OR TASK=633 OR TASK=686 OR TASK=688 OR TASK=689 OR TASK=692 OR TASK=696 OR TASK=705 OR TASK=706 OR TASK=707).	- Select FS tasks.
XTAB VAR=SUBSCORE BY ROTID /OPTIONS 3 4 5.	- Perform cross tabulation for FS SUBSCOREs across rotations.

Crosstabulation: SUBSCORE   SUBTASK SCORE
        By ROTID   ROTATION IDENTIF

- - - - Page

ROTID->	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE							
UNTRAINED	.	7 4.4 11.1 1.2	24 15.1 25.8 4.2	45 28.3 54.2 7.8	17 10.7 21.0 2.9	18 11.3 24.3 3.1	159 27.5
TRAINED	3	56 13.4 88.9 9.7	69 16.5 74.2 11.9	38 9.1 45.8 6.6	64 15.3 79.0 11.1	56 13.4 75.7 9.7	419 72.5
(Continued)	Column Total	63 10.9	93 16.1	83 14.4	81 14.0	74 12.8	578 100.0

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Crosstabulation: SUBSCORE   SUBTASK SCORE
              By PCTID   ROTATION IDENTIF

	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
ROTID→				
SUBSCORE				
UNTRAINED	1	14 9.8 17.1 2.4	34 21.4 33.3 5.9	159 27.5
TRAINED	3	68 16.2 82.9 11.8	68 16.2 66.7 11.8	419 72.5
Column Total		82 14.2	102 17.6	578 100.0

Number of Missing Observations =   0

A15

Table 10:

SPSS Command	Comment/Description
GET FILE='DEFEND'.	- Retrieve file.
SELECT IF (TASK=626 OR TASK=627 OR TASK=628 OR TASK=630 OR TASK=631 OR TASK=632 OR TASK=633 OR TASK=686 OR TASK=688 OR TASK=689 OR TASK=692 OR TASK=696 OR TASK=705 OR TASK=706 OR TASK=707).	- Select FS tasks.
XTAB VAR=SUBSCORE BY ROTID BY TASK /OPTIONS 3 4 5.	- Perform cross tabulation for FS SUBSCOREs across rotations by individual task.

ROTID→	Count Row Pct Col.Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE							
UNTRAINED	1		2 25.0 28.6 5.6	1 12.5 14.3 2.8			3 22.2
TRAINED	3	4 14.3 100.0 11.1	5 17.9 71.4 13.9	6 21.4 85.7 16.7	4 14.3 100.0 11.1	5 17.9 100.0 13.9	28 77.8
(Continued)	Column Total	4 11.1	7 19.4	7 19.4	4 11.1	5 13.9	36 100.0

A17

Crosstabulation: SUBSCORE   SUBTASK SCORE
              By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                          = 626 PLN/DE...

ROTID-->	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
SUBSCORE				
UNTRAINED	1	2 25.0 40.0 5.6	3 37.5 75.0 8.3	8 22.2
TRAINED	3	3 10.7 60.0 8.3	1 3.6 25.0 2.8	28 77.8
	Column Total	5 13.9	4 11.1	36 100.0

Crosstabulation: SUBSCORE   SUBTASK SCORE
              By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                          = 627

ROTID-->	Count Row Pct Col Pct Tot Pct	TF_D	TF_E	TF_F	TF_G	Row Total
SUBSCORE						
UNTRAINED	1	3 33.3 42.9 11.1	2 22.2 28.6 7.4	1 11.1 16.7 3.7	3 33.3 42.9 11.1	9 33.3
TRAINED	3	4 22.2 57.1 14.8	5 27.8 71.4 18.5	5 27.8 83.3 18.5	4 22.2 57.1 14.8	18 66.7
	Column Total	7 25.9	7 25.9	6 22.2	7 25.9	27 100.0

A18

Crosstabulation: SUBSCORE   SUBTASK SCORE
              By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER

                                              = 628 EXE FS PLN BN
                                                  - - - - Page

ROTID→ SUBSCORE	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	
UNTRAINED	1	1 10.0 25.0 3.3		3 30.0 60.0 10.0	1 10.0 25.0 3.3	3 30.0 50.0 6.7	
TRAINED	3	3 15.0 75.0 10.0	5 25.0 100.0 16.7	2 10.0 40.0 6.7	3 15.0 75.0 10.0	2 10.0 50.0 6.7	
(Continued)	Column Total	4 13.3	5 16.7	5 16.7	4 13.3	4 13.3	100.0

MORE

Crosstabulation: SUBSCORE   SUBTASK SCORE
              By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER

                                        = 628 EXE FS PLN BN
                                            - - - - Page

ROTID→ SUBSCORE	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
UNTRAINED	1	1 10.0 25.0 3.3	2 20.0 50.0 6.7	10 33.3
TRAINED	3	3 15.0 75.0 10.0	2 10.0 50.0 6.7	20 66.7
	Column Total	4 13.3	4 13.3	30 100.0

A19

Crosstabulation: SUBSCORE   SUBTASK SCORE
                By ROTID   ROTATION IDENTIF
         Controlling for TASK   T&EO TASK NUMBER
                                    = 630   PLN/DEV/COM FS PLN C

```
                Count    |
                Row Pct  |
 ROTID--        Col Pct  |              |              |   Row
                Tot Pct  | TF_A         | TF_B         |   Total
 SUBSCORE       ---------+--------------+--------------+
                  1      |        2     |       1      |      3
 UNTRAINED              |     66.7     |    33.3      |   23.1
                        |     40.0     |    12.5      |
                        |     15.4     |     7.7      |
                        +--------------+--------------+
                  3      |        3     |       7      |     10
 TRAINED               |     30.0     |    70.0      |   76.9
                        |     60.0     |    87.5      |
                        |     23.1     |    53.8      |
                        +--------------+--------------+
                Column          5              8             13
                Total         38.5           61.5          100.0
```

MORE

Crosstabulation: SUBSCORE   SUBTASK SCORE
                By ROTID   ROTATION IDENTIF
         Controlling for TASK   T&EO TASK NUMBER
                                    = 631   COM FS PLN CO

```
                Count    |
                Row Pct  |
 ROTID--        Col Pct  |              |              |   Row
                Tot Pct  | TF_A         | TF_B         |   Total
 SUBSCORE       ---------+--------------+--------------+
                  1      |        2     |       5      |      7
 UNTRAINED             |     28.6     |    71.4      |   77.8
                        |    100.0     |    71.4      |
                        |     22.2     |    55.6      |
                        +--------------+--------------+
                  3      |              |       2      |      2
 TRAINED              |              |   100.0      |   22.2
                        |              |    28.6      |
                        |              |    22.2      |
                        +--------------+--------------+
                Column          2              7              9
                Total         22.2           77.8          100.0
```

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Crosstabulation: SUBSCORE   SUBTASK SCORE
                By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                    = 632   EXE FS PLN CO

ROTID→ Count Row Pct Col Pct Tot Pct	TF_A	TF_B	Row Total
SUBSCORE			
1 UNTRAINED	1 33.3 33.3 14.3	2 66.7 50.0 28.6	3 42.9
3 TRAINED	2 50.0 66.7 28.6	2 50.0 50.0 28.6	4 57.1
Column Total	3 42.9	4 57.1	7 100.0

MORE

Crosstabulation: SUBSCORE   SUBTASK SCORE
                By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                    = 633

ROTID→ Count Row Pct Col Pct Tot Pct	TF_C	TF_D	TF_E	TF_F	TF_G	Row Total
SUBSCORE						
1 UNTRAINED	7 38.9 87.5 21.2	3 16.7 37.5 9.1		3 16.7 42.9 9.1	5 27.8 83.3 15.2	18 54.5
3 TRAINED	1 6.7 12.5 3.0	5 33.3 62.5 15.2	4 26.7 100.0 12.1	4 26.7 57.1 12.1	1 6.7 16.7 3.0	15 45.5
Column Total	8 24.2	8 24.2	4 12.1	7 21.2	6 18.2	33 100.0

A21

Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE						
1 UNTRAINED			3 27.3 33.3 5.5		3 27.3 42.9 5.5	11
3 TRAINED	6 13.6 100.0 10.9	9 20.5 100.0 16.4	6 13.6 66.7 10.9	8 18.2 100.0 14.5	4 9.1 57.1 7.3	44 80.0
Column Total	6 10.9	9 16.4	9 16.4	8 14.5	7 12.7	55 100.0

(Continued)

MORE

Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
SUBSCORE			
1 UNTRAINED		5 45.5 62.5 9.1	11 20.0
3 TRAINED	8 18.2 100.0 14.5	3 6.8 37.5 5.5	44 80.0
Column Total	8 14.5	8 14.5	55 100.0

A22

ROTID→ SUBSCORE	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
UNTRAINED	1		3 13.0 23.1 3.8	10 43.5 76.9 12.5	2 8.7 16.7 2.5	3 13.0 27.3 3.8	23 28.7
TRAINED	3	9 15.8 100.0 11.3	10 17.5 76.9 12.5	3 5.3 23.1 3.8	10 17.5 83.3 12.5	9 14.0 72.7 10.0	71.3
(Continued)	Column Total	9 11.3	13 16.3	13 16.3	12 15.0	11 13.8	80 100.0

MORE

ROTID→ SUBSCORE	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
UNTRAINED	1		5 21.7 45.5 6.3	23 28.8
TRAINED	3	11 19.3 100.0 13.8	6 10.5 54.5 7.5	57 71.3
	Column Total	11 13.8	11 13.8	80 100.0

A23

ROTID->	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE							
UNTRAINED	1		2 40.0 28.6 5.3	3 60.0 37.5 7.9			5 13.2
TRAINED	3	3 9.1 100.0 7.9	5 15.2 71.4 13.2	5 15.2 62.5 13.2	5 15.2 100.0 13.2	5 15.2 100.0 13.2	33 86.8
(Continued)	Column Total	3 7.9	7 18.4	8 21.1	5 13.2	5 13.2	38 100.0

MORE

ROTID->	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
SUBSCORE				
UNTRAINED	1			5 13.2
TRAINED	3	5 15.2 100.0 13.2	5 15.2 100.0 13.2	33 86.8
	Column Total	5 13.2	5 13.2	38 100.0

A24

Crosstabulation: SUBSCORE   SUBTASK SCORE
                By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER

                                        = 692 CSS BTRY

ROTID→ SUBSCORE	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
UNTRAINED	1		1 50.0 16.7 2.4	1 50.0 16.7 2.4			2 4.9
TRAINED	2	5 12.8 100.0 12.2	5 12.8 83.3 12.2	5 12.8 83.3 12.2	6 15.4 100.0 14.6	6 15.4 100.0 14.6	39 95.1
(Continued)	Column Total	5 12.2	6 14.6	6 14.6	6 14.6	6 14.6	41 100.0

MORE

Crosstabulation: SUBSCORE   SUBTASK SCORE
                By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER

                                        = 692 CSS BTRY

ROTID→ SUBSCORE	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
UNTRAINED	1			2 4.9
TRAINED	3	6 15.4 100.0 14.6	6 15.4 100.0 14.6	39 95.1
	Column Total	6 14.6	6 14.6	41 100.0

Crosstabulation: SUBSCORE   SUBTASK SCORE
                 By ROTID   ROTATION IDENTIF
      Controlling for TASK   T&EO TASK NUMBER
                                  = 696   SPEC TM OPN BTRY
                                                    - - - - Page 1 of 2

ROTID→	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE							
UNTRAINED	1		6 33.3 100.0 26.1	6 33.3 100.0 26.1		2 11.1 100.0 8.7	18 78.3
TRAINED	3	2 40.0 100.0 8.7			2 40.0 100.0 8.7		5 21.7
(Continued)	Column Total	2 8.7	6 26.1	6 26.1	2 8.7	2 8.7	23 100.0

Crosstabulation: SUBSCORE   SUBTASK SCORE
                 By ROTID   ROTATION IDENTIF
      Controlling for TASK   T&EO TASK NUMBER
                                  = 696   SPEC TM OPN BTRY
                                                    - - - - Page 2 of 2

ROTID→	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
SUBSCORE				
UNTRAINED	1	1 5.6 50.0 4.3	3 16.7 100.0 13.0	18 78.3
TRAINED	3	1 20.0 50.0 4.3		5 21.7
	Column Total	2 8.7	3 13.0	23 100.0

A26

Crosstabulation: SUBSCORE   SUBTASK SCORE
            By ROTID   ROTATION IDENTIF
   Controlling for TASK   T&EO TASK NUMBER

                           = 705 PLN SUPT TF MORT PLT

Count Row Pct Col Pct Tot Pct ROTID→ SUBSCORE	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
1 UNTRAINED		1 9.1 12.5 1.6		6 54.5 66.7 9.5	2 18.2 33.3 3.2	11 17.5
3 TRAINED	8 15.4 100.0 12.7	7 13.5 87.5 11.1	8 15.4 100.0 12.7	3 5.8 33.3 4.8	4 7.7 66.7 6.3	52 82.5
Column Total	8 12.7	8 12.7	8 12.7	9 14.3	6 9.5	63 100.0

(Continued)

Crosstabulation: SUBSCORE   SUBTASK SCORE
            By ROTID   ROTATION IDENTIF
   Controlling for TASK   T&EO TASK NUMBER

                           = 705 PLN SUPT TF MORT PLT

Count Row Pct Col Pct Tot Pct ROTID→ SUBSCORE	TF_F	TF_G	Row Total
1 UNTRAINED		2 18.2 13.3 3.2	11 17.5
3 TRAINED	9 17.3 100.0 14.3	13 25.0 86.7 20.6	52 82.5
Column Total	9 14.3	15 23.8	63 100.0

A27

Crosstabulation: SUBSCORE SUBTASK SCORE
                 By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                        = 706   PREP COMBAT OPN MORT
                                               - - - - Page 1

	Count Row Pct ROTID—> Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE							
UNTRAINED	1	1 6.3 20.0 1.5	1 6.3 20.0 1.5	4 25.0 80.0 6.0	2 12.5 20.0 3.0	1 6.3 10.0 1.5	16 23.9
TRAINED	3	4 7.8 80.0 6.0	4 7.8 80.0 6.0	1 2.0 20.0 1.5	8 15.7 80.0 11.9	9 17.6 90.0 13.4	51 76.1
(Continued)	Column Total	5 7.5	5 7.5	5 7.5	10 14.9	10 14.9	67 100.0

Crosstabulation: SUBSCORE SUBTASK SCORE
                 By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                        = 706   PREP COMBAT OPN MORT
                                               - - - - Page 2 of

	Count Row Pct ROTID—> Col Pct Tot Pct	TF_F	TF_G	Row Total
SUBSCORE				
UNTRAINED	1	4 25.0 36.4 6.0	3 18.8 14.3 4.5	16 23.9
TRAINED	3	7 13.7 63.6 10.4	18 35.3 85.7 26.9	51 76.1
	Column Total	11 16.4	21 31.3	67 100.0

A28

Crosstabulation: SUBSCORE   SUBTASK SCORE
              By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                        = 707   FIRE SUPT TF MORT PL

ROTID→	Count Row Pct Col Pct Tot Pct	TF_A	TF_B	TF_C	TF_D	TF_E	Row Total
SUBSCORE							
UNTRAINED	1			7 46.7 87.5 12.5		3 20.0 42.9 5.4	15 26.8
TRAINED	3	7 17.1 100.0 12.5	8 19.5 100.0 14.3	1 2.4 12.5 1.8	6 14.6 100.0 10.7	4 9.8 57.1 7.1	41 73.2
(Continued)	Column Total	7 12.5	8 14.3	8 14.3	6 10.7	7 12.5	56 100.0

Crosstabulation: SUBSCORE   SUBTASK SCORE   MORE
              By ROTID   ROTATION IDENTIF
        Controlling for TASK   T&EO TASK NUMBER
                                        = 707   FIRE SUPT TF MORT PL

ROTID→	Count Row Pct Col Pct Tot Pct	TF_F	TF_G	Row Total
SUBSCORE				
UNTRAINED	1	2 13.3 25.0 3.6	3 20.0 25.0 5.4	15 26.8
TRAINED	3	6 14.6 75.0 10.7	9 22.0 75.0 16.1	41 73.2
	Column Total	8 14.3	12 21.4	56 100.0

Number of Missing Observations =   0

Table 12:

Cross-match of data for Tasks 630, 631, 632, and 633 presented in Task 633 format.

	A	B	C	D	E	F	G
SUBSCORE 1	GO(2)	GO(3)	GO(1) NG(2)	GO(2)	GO(1)	GO(2)	GO(1) NG(1)
STS1	GO(3)	GO(3)	GO(2) NG(1)	GO(2)	GO(1)	GO(1) NG(1)	GO(1) NG(1)
STS2	GO(1) NG(1)	GO(2) NG(1)	GO(2) NG(1)	GO(2)	GO(1)	GO(2)	GO(2)
STS3	GO(2)	GO(2) NG(1)	GO(2) NG(1)	GO(1) NG(1)	GO(1)	GO(2)	GO(2)
STS4	GO(2)	GO(1) NG(2)	GO(1) NG(2)	GO(2)	GO(1)	NG(2)	NG(2)
STS5	No Match	No Match	GO(1) NG(2)	GO(2)	GO(1)	GO(1) NG(1)	GO(1) NG(1)
STS6	NA	NA	GO(1) NG(2)	GO(1) NG(1)	NA	GO(1) NG(1)	GO(1) NG(1)
STS7	NA	NA	NG(3)	GO(1) NG(1)	GO(1)	GO(1) NG(1)	NG(2)
SUBSCORE 2	NG(1)	GO(2)	NG(3)	GO(1) NG(1)	GO(1)	NG(2)	NG(1)
STS1	NG(1)	NG(2)	NG(3)	GO(1)	NA	NG(2)	NG(1)
STS2	NG(1)	NA	NG(3)	GO(1) NG(1)	NG(1)	GO(1) NG(1)	GO(1)
STS3	No Match	No Match	NG(3)	NG(2)	GO(1)	GO(1)	GO(1)
SUBSCORE 3	No Match	No Match	NG(1)	GO(1) NG(1)	GO(1)	GO(1)	NG(1)
STS1	NG(1)	GO(1) NG(1)	NG(1)	NG(2)	GO(1)	NG(1)	GO(1)
STS2	GO(1)	GO(1) NG(1)	NG(1)	GO(1) NG(1)	GO(1)	NA	NA

	A	B	C	D	E	F	G
STS3	NG(1)	NA	NG(1)	NG(2)	GO(1)	GO(1)	NG(1)
STS4	NG(1)	NA	NG(1)	GO(1) NG(1)	NG(1)	GO(1)	GO(1)
STS5	GO(1)	NA	NG(1)	NG(2)	GO(1)	GO(1)	GO(1)
STS6	GO(1)	NA	NG(1)	GO(1) NG(1)	GO(1)	GO(1)	GO(1)
STS7	NG(1)	NA	NG(1)	GO(1) NG(1)	GO(1)	GO(1)	GO(1)
STS8	NG(1)	GO(1) NG(1)	NA	GO(1) NG(1)	GO(1)	GO(1)	NG(1)
STS9	NA	NA	NA	NA	GO(1)	GO(1)	NA
STS10	No Match	No Match	NA	GO(1) NG(1)	GO(1)	GO(1)	GO(1)
STS11	No Match	No Match	NA	GO(1)	NA	GO(1)	GO(1)
STS12	No Match	No Match	NA	GO(1)	GO(1)	NG(1)	NA
SUBSCORE 4	NG(1)	GO(1) NG(1)	NA	GO(1) NG(1)	GO(1)	GO(1) NG(1)	NG(2)
STS1	No Match	No Match	NA	GO(1) NG(1)	GO(1)	GO(1)	NG(1)
STS2	GO(1) NG(1)	GO(2) NG(2)	NA	GO(2)	GO(1)	GO(1)	NG(1)
STS3	No Match	No Match	NA	NG(2)	GO(1)	GO(1) NG(1)	NG(1)

POINT	PHASE	OPSYS	TASK	SUBTASK	SUBSCORE	1	2	3	4	5	6	7	8	STSS	STS
TF_A	3	3	630	1	3	2	2	2	1	2	1	.	.	.	.
TF_A	3	3	630	1	3	2	1	2	2	2	2	.	.	.	.
TF_A	3	3	630	2	1	2	2	1	1	1	1	1	2	1	2
TF_A	3	3	630	2	3	2	2	1	2	1	1	2	1	2	2
TF_A	3	3	630	3	1	1	2	1	.	.	.	.	.	.	.
TF_A	3	3	631	1	1	1	1	2	0	0	.	.	.	.	.
TF_A	3	3	631	5	1	2	2	1	1	1	1	1	.	.	.
TF_A	3	3	632	1	1	1	2	1	1	1	.	.	.	.	.
TF_A	3	3	632	2	3	2	2	1	.	.	.	.	.	.	.
TF_A	3	3	632	3	3	0	0	1	2	1	0	1	2	2	0
TF_B	2	3	630	1	3	2	1	2	2	2	0	.	.	.	.
TF_B	2	3	630	1	3	2	1	2	1	1	2	.	.	.	.
TF_B	2	3	630	1	3	2	2	2	2	2	2	.	.	.	.
TF_B	2	3	630	2	3	2	2	2	2	1	2	1	2	1	2
TF_B	2	3	630	2	1	2	2	1	1	1	1	1	2	1	2
TF_B	2	3	630	2	3	2	2	2	2	2	0	0	0	2	
TF_B	2	3	630	3	3	2	2	2	.	.	.	.	.	.	.
TF_B	2	3	630	3	3	2	2	2	.	.	.	.	.	.	.

PUTID	PHASE	OPSYS	TASK	SUBTASK	SUBSCORE	STS1	STS2	STS3	STS4	STS5	STS6	STS7	STS8	STS9	STS10	STS11
TF_C	2	3	631	1	5	1	1	2	0	0	.	.	.	.	.
TF_C	2	3	631	1	5	2	1	2	3	3	.	.	.	.	.
TF_C	2	3	631	2	1	1	1	1	1	1	1	0	1	.	1
TF_C	2	3	631	3	1	0	0	0	0	0	0	0	0	.	0
TF_C	2	3	631	4	1	1	1	1	0	2	.	.	.	.	.
TF_C	2	3	631	5	1	2	2	1	2	1	1	.	.	.	.
TF_C	2	3	631	6	1	2	2	1	1	1	1	2	.	.	.
TF_C	2	3	632	1	1	1	1	1	1	.	.	.	.	.	.
TF_C	2	3	632	1	3	2	2	2	2	2	.	.	.	.	.
TF_C	2	3	632	2	1	1	1	1	.	.	.	.	.	.	.
TF_C	2	3	632	2	3	2	2	2	.	.	.	.	.	.	.
TF_C	4	3	633	1	3	2	1	2	2	2	1	.	.	.	.
TF_C	4	3	633	1	1	1	1	1	1	1	1	1	.	.	.
TF_C	4	3	633	1	1	2	2	2	1	1	1	1	.	.	.
TF_C	4	3	633	2	1	1	1	1	.	.	.	.	.	.	.
TF_C	4	3	633	2	1	1	1	1	.	.	.	.	.	.	.
TF_C	4	3	633	2	1	1	1	1	.	.	.	.	.	.	.

MORE

PUTID	PHASE	OPSYS	TASK	SUBTASK	SUBSCORE	STS1	STS2	STS3	STS4	STS5	STS6	STS7	STS8	STS9	STS10	STS11
TF_C	4	3	633	3	1	1	1	1	1	1	1	1	.	.	.
TF_D	3	3	633	1	3	2	2	2	2	2	1	1	.	.	.
TF_C	3	3	633	1	3	2	2	1	2	2	2	2	.	.	.
TF_D	3	3	633	2	1	1	1	1	.	.	.	.	.	.	.
TF_D	3	3	633	2	3	0	2	1	.	.	.	.	.	.	.
TF_D	3	3	633	3	1	1	1	1	1	1	1	1	1	1	1
TF_D	3	3	633	3	3	1	2	1	2	1	2	2	2	.	0	2
TF_D	3	3	633	4	1	1	2	1	.	.	.	.	.	.	.
TF_D	3	3	633	4	3	2	2	1	.	.	.	.	.	.	.
TF_E	3	3	633	1	3	2	2	2	2	.	2	.	.	.	.
TF_E	3	3	633	2	3	0	1	2	.	.	.	.	.	.	.
TF_E	3	3	633	3	3	2	2	1	2	2	2	2	.	2	2
TF_F	3	3	633	4	3	2	2	2	.	.	.	.	.	.	.
TF_F	3	3	633	1	3	2	3	3	2	2	2	9	.	.	.
TF_F	3	3	633	1	3	3	3	2	3	3	3	9	.	.	.
TF_F	3	3	633	2	1	2	2	1	9	.	.	.	.	.	.
TF_F	3	3	633	2	1	2	3	3	9	.	.	.	.	.	.
TF_F	3	3	633	3	3	2	.	3	3	3	3	3	3	.	2	.

A34

APPENDIX B   Tasks Executed in the Defensive Phase

TASK NUMBER	ECHELON (a)	TASK DESCRIPTION
10	Battalion	- Conduct a defense
21	Battalion	- Consolidate and reorganize
65	Battalion	- Develop, coordinate, & communicate a plan in support of ground maneuver
66	Battalion	- Prepare to execute combat operations
67	Battalion	- Execute combat/combat support operations
86	Company	- Defend
100	Company	- Passage of lines (Fwd)
102	Company	- Perform linkup
103	Company	- Linkup operation
111	Company	- Occupy an assembly area
116	Company	- Move tactically
117	Company	- Consolidate and reorganize
124	Company	- Execute logistical support
125	Company	- Execute personnel actions
200	Company	- Conduct a surveillance
275	Company	- Develop a plan to support the TF in combat operations
277	Company	- Provide anti-armor support to TF defense
325	Platoon	- Perform helicopter movement
332	Platoon	- Defend
335	Platoon	- Establish patrol base/hide position
339	Platoon	- Passage of lines (Rwd)
341	Platoon	- Perform linkup
347	Platoon	- Defend battle position
348	Platoon	- Tactical road march
349	Platoon	- Occupy an assembly area
350	Platoon	- Breach an obstacle
354	Platoon	- Move tactically
356	Platoon	- Conduct a zone reconnaisance
357	Platoon	- Reconnoiter area
358	Platoon	- Reconnoiter zone
359	Platoon	- Reconnoiter route
371	Platoon	- Consolidate and reorganize
376	Platoon	- Perform anti-armor ambush
385	Platoon	- Occupy observation post/ perform surveillance
388	Platoon	- Employ fire support
389	Platoon	- Construct obstacles
390	Platoon	- Sustain
600	Battalion	- Develop/communicate a plan based on the mission

a. The JRTC Task List provided for this analysis designated
    Battalion, Company, Platoon, and Battery only.

TASK NUMBER	ECHELON (a)	TASK DESCRIPTION
602	Battalion	– Prepare for combat operation
603	Battalion	– Command & control operations
604	Battalion	– Report to higher headquarters
610	Company	– Develop/communicate a plan based on the mission
611	Platoon	– Prepare for combat
626	Battalion	– Plan, develop, & communicate a tentative/final TF fire support plan
627	Battalion	– Prepare initial FS plan in support of the maneuver plan
628	Battalion	– Execute FS plan in support of maneuver plan
630	Company	– Develop/communicate a tentative & final company FS plan
631	Company	– Communicate final FS company fire support plan & prepare FS assets to execute FS plan
632	Company	– Execute company FS plan in support of the maneuver plan
633	Company	– Plan, prepare, & execute a company FS plan
686	Company	– Conduct tactical movement
688	Company	– Battery operations
689	Company	– Provide tactical & technical fire direction support
692	Company	– Combat service support
696	Company	– Provide battery defense
705	Battery	– Plan to support the TF in combat operations
706	Battery	– Prepare for combat operations
707	Battery	– Provide fire support to the TF
711	Battery	– Conduct combat operations
713	Battery	– Operate by platoon
714	Battery	– Occupy a firing position
718	Battery	– Defend against ground attack
721	Battery	– Operate an FDC
723	Battery	– Sustain mortars
724	Battery	– Consolidate and reorganize
725	Battalion	– Plan, prepare, & execute a TF close air support
750	Battalion	– Plan M/CM/S operations
751	Battalion	– Prepare for engineer operations

a. The JRTC Task List provided for this analysis designated Battalion, Company, Platoon, and Battery only.

TASK NUMBER	ECHELON (a)	TASK DESCRIPTION
753	Platoon	– Execute countermobility operations
754	Platoon	– Conduct survivability operations
770	Platoon	– Plan M/CM/S operations
771	Platoon	– Prepare for engineer operations
772	Platoon	– Prepare obstacle plan
773	Platoon	– Prepare an engineer annex
774	Platoon	– Control engineer equipment
790	Platoon	– Install/remove a hasty protective minefield
797	Platoon	– Construct a tank ditch
815	Platoon	– Camouflage vehicles and equipment
816	Platoon	– Establish job-site security
974	Platoon	– Plan, develop, & communicate an air defense
976	Platoon	– Provide command, control, & sustainment operations
979	Platoon	– Provide air defense for a static asset
985	Platoon	– Provide aid defense for a maneuvering force
1025	Battalion	– Develop & communicate a combat service support plan
1026	Battalion	– Prepare for CSS operations
1027	Battalion	– Conduct field trains command post operations
1028	Battalion	– Operate a combat trains command post
1029	Battalion	– Conduct supply operations
1030	Battalion	– Conduct food service, field service, transportation, & decontamination operations
1031	Battalion	– Conduct maintenance operations
1032	Platoon	– Provide continuous medical support
1033	Battalion	– Conduct personnel service support (PSS) in a combat environment
1037	Company	– Provide continuous medical support

a. The JRTC Task List provided for this analysis designated Battalion, Company, Platoon, and Battery only.

TASK NUMBER	ECHELON (a)	TASK DESCRIPTION
1038	Company	- Conduct maintenance operations
1050	Battalion	- Develop plan to provide religious support to combat operations
1051	Battalion	- Prepare to provide religious activities in support of combat operations
1052	Battalion	- Conduct/execute basic and advanced soldier skills
1053	Battalion	- Conduct religious activities in support of combat operations
1054	Battalion	- Conduct chaplin assisstant duties
1100	Battalion	- Establish priority intelligence requirements (PIR) and intelligence requirements (IR)
1101	Battalion	- Estimate probable enemy situation
1102	Battalion	- Determine IEW requirements
1103	Battalion	- Plan collection of information
1104	Battalion	- Supervise intel collection
1108	Battalion	- Plan intel support to TF operations
1109	Battalion	- Prepare intel support to TF operations
1110	Battalion	- Execute intel support to TF operations
1200	Battalion	- Defend against persistent & non-persistent chemical agents
1201	Battalion	- Conduct smoke operations/ operations under limited visibility
1204	Battalion	- Plan NBC operations
1205	Company	- Plan NBC operations
1206	Company	- Prepare for NBC operations
1207	Company	- Execute NBC operations
1208	Battalion	- Prepare for NBC defense operations
1210	Battalion	- Predeployment NBC operations

a. The JRTC Task List provided for this analysis designated Battalion, Company, Platoon, and Battery only.

TASK 630: Develop and communicate a tentative and final company fire support plan.

Subtask 1   Co FSO develops a tentative FS plan.

(a) STS 1   Co FSO gathered information for use in developing company FS plan.

STS 2   Co FSO understood company's mission, Cdr's intent, and specified/implied tasks.

STS 3   Co FSO reviewed and verified status of supporting FS assets.

STS 4   Co FSO identified mission essential company tasks.

STS 5   Co FSO determined limitations on FS actions.

STS 6   Co FSO recommended mission statement based on Co Cdr's guidance.

Subtask 2   Perform coordination and develop estimate.

STS 1   Co FSO coordinated with TF FSO, Plt FOs, and mortar sergeant.

STS 2   Co FSO gathered information to develop final plan.

STS 3   Co FSO prepared an FS estimate.

STS 4   Co FSO recommended a course of action to the Cdr.

STS 5   Co FSO analyzed friendly/enemy capabilities.

STS 6   Contingencies were discussed and decision points were identified.

STS 7   The selected COA contained FS coordination measures.

STS 8   A scheme of fires to support maneuver was included.

STS 9   Use of DS, GS, and GSR fires was discussed.

a.   STS = subtask standard.

TASK 630: Develop and communicate a tentative and final company fire support plan -- continued.

STS 10   Admin/log requirements were identified.

STS 11   Liaison/coordination requests were discussed.

Subtask 3   Prepare an FS plan and execution matrix.

STS 1   FS plan supports the Co Cdr's scheme of maneuver.

STS 2   FS plan contains sufficient targets and control measures to accomplish the mission.

STS 3   FS plan and execution matrix are IAW FM 6-20 and FC 6-20-20.

TASK 631: Communicate a final company fire support plan and prepare fire support assets to execute plan to support maneuver combat operations.

Subtask 1   Prepare to support operations.

STS 1   Did all FS elements understand the plan?

STS 2   Did all elements rehearse the matrix & plan?

STS 3   Were FS assets in position or in station?

STS 4   Did the Bn FSE conduct a commo check with all elements?

STS 5   Were all elements ready to fire?

Subtask 2   Plan fires in support of a movement to contact.

STS 1   Were immediate responsive fires planned for the lead team?

STS 2   Were fire planned to suppress enemy indirect fire assets?

STS 3   Were targets beyond the objective attacked with massive fires?

STS 4   Were enemy air defense assets targeted for suppression?

STS 5   Was smoke planned to screen friendly troops?

TASK 631: Communicate a final company fire support plan and prepare fire support assets to execute plan to support maneuver combat operations - continued.

STS 6	Were O/L teams with the lead platoon planned?
STS 7	Was the plan decentralized?
STS 8	Were request procedures streamlined?
STS 9	Were FS coordination measures planned beyond the LD?
STS 10	Were FS assets positioned well forward?
Subtask 3	**Plan fires in support of a hasty attack.**
STS 1	Was it planned initially to concentrate fires on enemy forward positions?
STS 2	Was suppression planned for enemy direct fire weapons?
STS 3	Was smoke planned to screen friendly forces?
STS 4	Was deep fire planned to isolate the enemy position?
STS 5	Were the lead elements given priority of fires?
STS 6	Were fires planned to suppress the enemy's position and screen friendly movement?
STS 7	Were on-call fires planned to neutralize resistance during the final assault?
STS 8	Were fires to break up enemy counterattacks planned?
STS 9	Were O/L teams planned for lead elements?
Subtask 4	**Plan fires to exploit and pursue the enemy.**
STS 1	Was planned fire support flexible and highly mobile?
STS 2	Were fires planned to fix bypassed enemy elements until they can be dealt with?

TASK 631: Communicate a final company fire support plan and prepare fire support assets to execute plan to support maneuver combat operations -- continued.

STS 3   Were fires planned to slow down or block enemy retreat?

STS 4   Was the plan updated as exploitation continued?

STS 5   Were fires planned to keep the enemy from breaching hasty minefields?

Subtask 5   Plan fire in support of defensive operations.

STS 1   Was the FS planned based on the Cdr's guidance?

STS 2   Was target assignment consistent with availability of FS assets?

STS 3   Was fire planned to suppress enemy direct/indirect fire weapons?

STS 4   Were illumination & smoke planned?

STS 5   Was fire planned to isolate enemy echelons?

STS 6   Was fire planned to suppress enemy ADA assets?

STS 7   Were targets planned for each defensive fire line?

Subtask 6   Plan fires in support of a covering force operation.

STS 1   Were fires planned to engage enemy early and strip away his recon assets?

STS 2   Were fires planned deep to confuse the enemy & force him to deploy early?

STS 3   Was a close interface planned between FSEs for smooth hand-off at passage of lines?

STS 4   Was is planned to place O/L teams over-watching likely avenues of approach?

TASK 631: **Communicate a final company fire support plan and prepare fire support assets to execute plan to support maneuver combat operations - continued.**

STS 5   Was planning and coordination as formal as possible?

STS 6   Were screening fires planned?

Subtask 7   Plan fires in support of retrograde operations.

STS 1   Were fires planned to attack forwardmost enemy forces?

STS 2   Were fires planned to assist in disengagement?

STS 3   Were fires planned to support limited counterattacks?

STS 4   Were obstacles, barriers, gaps, and flanks covered with fires and scatterable mines?

STS 5   Were maximum continuous fires planned as elements displaced to the rear?

STS 6   Were mass fires planned on the enemy as he massed for attack on delay positions?

TASK 632: **Execute company fire support plan in support of the maneuver plan.**

Subtask 1   FSO maintains communications and coordinates.

STS 1   Commo is maintained with mortars, TF FSO, Co Cdr, observers, and FA battalion.

STS 2   FSO keeps higher level FSO, observers, and FA battalion informed of current situation.

STS 3   Changes are posted to FS tactical sitmaps and target overlays.

STS 4   Changes to target list are distributed.

STS 5   Changes in FS asset status are provided to all coordinating FS elements.

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TASK 632: Execute company fire support plan in support of the maneuver plan -- continued.

Subtask 2   Update fire support plan.

    STS 1   FS plan is updated upon receipt if immediate FS request.

    STS 2   FS plan is adjusted to accommodate changes in FS capabilities.

    STS 3   Major changes to FS plan are approved by the Co Cdr.

Subtask 3   Process planned fire support requests.

    STS 1   Precedence, type of ammo, and desired effect are considered for each target.

    STS 2   Target's effect on mission is considered.

    STS 3   Execution matrix is used to execute planned fires.

    STS 4   Priority of fires is to the lead element.

    STS 5   Fires are shifted to best accomplish the Cdr's intent.

    STS 6   Smoke is effective in obscuring or screening movement.

    STS 7   Company FSO continually keeps Cdr and TF FSO informed.

    STS 8   All fire missions are either cleared or denied.

    STS 9   Indirect fires into the Co area are cleared by the FSO.

    STS 10   Indirect fires out of the Co area are coordinated by the FSO.

TASK 633: Plan, prepare, & execute a company fire support plan.

Subtask 1   Company FSO develops a company FS plan.

    STS 1   The FSO understands the company's mission, Cdr's intent, & specified and implied tasks.

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TASK 633: Plan, prepare, & execute a company fire support plan -- continued.

STS 2   The FSO identifies mission essential tasks.

STS 3   The FSO determines limitations on FS assets.

STS 4   The FSO coordinates with the Bn FSO, Plt FOs, and mortar sergeant.

STS 5   The fire support plan supports the Cdr's intent and scheme of maneuver.

STS 6   The plan contains sufficient targets & control measures to accomplish the mission.

STS 7   The FS plan and execution matrix are IAW FM 6-20-50 AND FC 6-20-20.

Subtask 2   Prepare to support operations.

STS 1   Did all elements rehearse the plan?

STS 2   Was the plan adjusted to support changes in the maneuver plan?

STS 3   Were the plan and matrix forwarded to the BN FSE & 60mm mortar section?

Subtask 3   Execute the FS plan.

STS 1   Was commo maintained with the Cdr, TF FSO, Plt FOs, mortars, DS BN, and Btry FDCs?

STS 2   Were changes in the plan forwarded to the BN FSE?

STS 3   Was the execution matrix followed?

STS 4   Fires are shifted as the battle develops.

STS 5   Indirect fire into or near the company sector is cleared by the company FSO.

STS 6   Priority fires are to the designated element.

STS 7   The company FSO keeps the commander informed.

STS 8   Major changes in the plan are approved by the company Cdr.

TASK 633: **Plan, prepare, & execute a company fire support plan -- continued.**

STS 9   Special munitions are employed as needed or directed.

STS 10   The company FSO coordinates platoon FO activities.

STS 11   Priority targets are shifted as the company maneuvers.

STS 12   The company FSO keeps the BN FSO informed.

Subtask 4   Assets are continually coordinated.

STS 1   The company FSO looks ahead to facilitate future operations.

STS 2   Reports are submitted as required.

STS 3   All requests for fire support are monitored.